PERCEIVED EARNINGS FUNCTIONS AND *EX ANTE* RATES OF RETURN TO HIGHER EDUCATION - A CASE STUDY OF HONG KONG

by

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ABSTRACT

This thesis sets out to use Hong Kong as a case to examine the propositions of a) Human Capital Theory - that students take systematic forward-looking view of earnings prospects and b) Signalling/Screening Hypothesis - that students are aware of their ability and those who are capable would invest more in higher education. The perceived earnings functions and *ex ante* rates of return to higher education of the students are estimated. In the process, the factors which affect the demand for higher education are also explored.

The thesis shows that the majority of the Hong Kong Form V students, who were in their final year of schooling in secondary school education, were largely economically motivated for higher learning. The students were rather realistic in the estimation of their lifetime earnings in association with different levels of education. Other than levels of schooling, the variables of sex, home background, parents' education, students' ability and quality of institutions all have some bearings on the demand for higher education and expected lifetime earnings. The perceived *ex ante* rates of return to higher education, measured according to sex, ability, social background and quality of institutions were similar to the private rates of return based on census data. This explains why higher education in Hong Kong is in such a popular demand.

On the other hand, it was found that the intentions for higher education were ability associated. In the study, the Form V students expressed their intentions before they sat for the HKCE. Yet the intentions were verified to be closely related to the HKCE results. Those who intended to pursue university education had higher academic results in the HKCE than those who preferred post-secondary education and who in turn were better than those who intended to work after Form V. This evidence seems to give support to the arguments of the Signalling Hypothesis.

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CHAPTER 1 INTRODUCTION

1.0 Points of Interest

Even since the emergence of Human Capital Theory which stresses the investment made in human resources to improve their productivity in the early 1960s, education has been linked with enhancement of productivity and economic growth. Many empirical studies on the role of education have concentrated on the supply side of the picture - a phenomenon which reflects the fact that education is largely provided by the government in many countries. The literature is full of measurements of rates of return to education based on cross-sectional data (see Blaug, 1978). The consistently high social rates of return to education[1] in the 1960s and 1970s were often used as justification for the policy guidelines for quantitative expansion of educational opportunities over other investment projects as well as priority areas within the educational system itself (Psacharopoulos & Woodhall, 1985). Behind all these studies, the individuals who would exercise rational maximizing behaviour in markets is often assumed. Little

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[1] The benefits of social rates of return are confined to the observable pecuniary values only. Non-pecuniary returns to education and the externalities connected with education are ignored.

attention has been given to understand this behaviour in the demand for education. Perhaps it is not easy for students to estimate the benefits associated with additional years of schooling. Even if expected net return stream could be estimated, it does not necessarily follow that the students would take up the extra education because of the different subjective 'time preference rate' in interest (Blaug, 1972, 1983). The lack of ability or the disadvantaged home background of the students may further prevent them from taking up the benefits (Williams and Gordon, 1981). At any rate, very few studies have been devoted to investigating whether the students who pursue higher education actually take a forward-looking view of earnings prospects in the labour market[2].

In the 1970s, among the critics of Human Capital Theory, The Screening/Signalling hypothesis[3] proponents

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2. According to Blaug (1976), the studies by Campell & Siegel (1967), Galper & Dunn (1968), Miller (1971) and Freeman (1971) in the United States were the only examples in the early part of the period which tried to establish that students were responsive to the earnings differentials.

3. This is a theory with two sides: the side of students who invest in education to signal to the potential employers their high abilities (signalling) and the side of employers who rely on qualifications to screen the potential workers (screening).

claimed that the main function of education is to sort individuals by their abilities with educational credentials. It is now generally accepted that educational institutions do screen. 'What is debatable is whether schools screen for some *ex ante* innate ability or for some *ex post* ability which includes the productivity-augmenting effects of education. From the point of view of either the individual or the private employer the answer to this question is largely irrelevant. The individual will continue to invest in education as long as marginal benefits exceed marginal costs.' (Winkler, 1987). For the able students, the marginal costs have been low. Hence it is the high-ability students who would invest more in education. By investing in education, the able students are making a signal of their high productivity to the potential employers. To make the theory work, it is assumed that students are able to know their ability.

If empirical study is carried out from the demand side of education, not only the assumption of Human Capital Theory that students take systematic forward-looking view of earnings prospects could be tested, the hypothesis of Screening/Signalling that students are aware of their ability and that those students with high ability would invest more in higher education could also

be examined.

This seems a fruitful proposition for study.

Hong Kong has been a free market with limited government interference ever since it became a colony of Great Britain. It was referred to by Friedman (1979) as a prime example of a free market economy. But this is by no means the case in the provision of education. After a relatively free market for private schools in the 50s and the early 60s, the government gradually stepped up its influence in education. When the economy began to pick up in the 60s and 70s, the control of the government over the provision of education first in the primary schools in the late 60s and then on to the secondary education in the late 70s was established. Meanwhile, higher education places has been in great demand.

In the early 80s, only about 2% of the young people of the relevant age group (17 to 20) entered the university[4]. The nine-year free and compulsory education

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[4]. In late 1980s, the Government began to massively expand the tertiary education. The intake of the two universities was increased from 4% annually in early 1980s to 7% annually in late 1980s. In 1989, there are 36,000 full-time places which represent a 7% of the young people of the relevant age group for first

until Form III first introduced in 1979 has further aggravated the situation. After Form III, over 90% of the students stayed on up to Form V (Half-yearly Statistics Report, Education Department, 1980-1985). In November 1980, a Committee to Review Post-secondary and Technical Education[5] (hereafter CRE) was formed to review the adequacy of the provision for higher learning in Hong Kong until the year 2001. Its analysis showed that in 1980 the overall ratio between application to and places available at the University of Hong Kong was 3.5:1; the Chinese University of Hong Kong was 4.2:1 and Hong Kong Polytechnic was 5.0:1 (CRE). Clearly, even allowing for duplicate applications, each Higher Institution was estimated to receive 3-5 times more applications than the number of places available. The Committee assessed (Table 1.1) the rise of the number of students in senior secondary against the population of

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degree courses and 4% for non-degrees studies. A third university will be opened in early 1990s. The plan is to provide 14% of the relevant age group for first degree and 6% for non-degree studies in 2000. Despite this expansion, Mr. Dominic Wong, the Deputy Secretary for Education and Manpower acknowledged that until mid 1990 Hong Kong would continue to suffer from a shortage of full-time places in higher education (SCMP, 4/3/1989).

5. The Committee to Review Post-secondary and Technical Education published a report in June, 1981. But the report was not publicly released.

the appropriate ages as follows:

Table 1.1
Number of students in Form V and Sixth Forms as compared with 17-19 year-old population

	1975	1980	1985	% increase 1975-85
17 year-old population	104,000	121,200	91,687	-12.3
Enrolment in Form 5/Middle 5	36,994	66,692	76,092	105.6
18 year-old population	100,800	127,200	91,954	- 9.2
Enrolment in Lower F 6/Middle 6	12,943	20,165	23,290	79.9
19 year-old population	97,300	135,500	94,829	- 2.5
Enrolment in Upper F 6	4,129	8,443	14,044	240.1

Source: Adapted & Expanded from Table 2:2 of CRE

Table 1.1 shows that the number of students enroled in Form V, Lower and Upper Form VI rose very rapidly. The increase of student population in Form V from 1975 to 1985 was over 105% while in Upper Form VI, the increase was over 200% against a declining population[6] in the relevant age brackets. But entrance to higher institutions of learning in Hong Kong has never been a

6. The population of Hong Kong is like the shape of an hour class.

straight forward process. There are hurdles to be cleared.

The government policy states that 'the government will provide subsidized sixth-form places for up to one third of students entering subsidized Form IV places two years previously, subject to sufficient numbers of suitable students seeking admission' (The White Paper on The Development of Senior Secondary and Tertiary Education, 1978). This was based on the suitability argument that for courses at post-Form V level, the students are required to obtain at least five Grade Es in the Hong Kong Certificate Education (hereafter HKCE which is equivalent to GCE O level in England and Wales) if they want to attempt the Chinese University matriculation or to obtain at least three Grade Cs (credits) if they want to apply for the matriculation of the University of Hong Kong. Although no pass standard is set for the HKCE, Grade E is normally considered as the passing standard. In 1981, the government released a 'tracer' study[7] which compared the number of Primary 6 students in 1971, 1972 and 1973 and the number of Form V

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[7]. This exercise was done as a comprehensive report (later on published as the Hong Kong Education System) for the use and reference of the OECD panels of educationalist who came to examine the Hong Kong education system in 1980.

students five years later who obtained 5 subjects in E grades or above and 3 C credits or above in HKCE. The study seemed to justify the existing policy. The figures of the 'tracer' study are as follows (Table 1.2):

Table 1.2
Tracer study of student enrolment

Year	No of pupils in Primary 6 in March 1971	No of pupils with 5 Es and above 5 years later (%)	No of pupils with 3 credits & above 5 years later (%)
71/76	93,240	25,256 (27.1)	7,941 (8.5)
72/77	103,996	30,127 (29.0)	10,079 (9.7)
73/78	110,906	34,741 (31.3)	11,608 (10.5)
74/79	113,848	38,346 (33.8)	12,340 (10.8)

Source: Adopted from Appendix N, Table 1 to 4 of The Hong Kong Education System, 1981

According to this comparison, only above one third of the cohort who started Form I five years ago obtained 5 E passes and above in HKCE five years later. For 3 C credits and above the figure was reduced to about 10%. But the actual number of students who obtained the above qualifications in HKCE is higher. Table 1.3 shows that the number of students who obtained 5 E passes and 3 C credits in the HKCE and the number of students who were qualified in the High Level Examination (hereafter HL which is the entrance exam for the Chinese University of

Hong Kong) and the Advanced Level Examination (hereafter AL which is the entrance examination for the University of Hong Kong) in 1975, 1980 and 1985. In the HKCE around 45% and 15% candidates obtained 5 E and 3 C respectively. In HL and AL, the passing rate was around 24% and 60% respectively. But because of the limited places available in the two universities, the number of students who actually entered the two universities was small. In 1985, the University of Hong Kong accepted around 1500 students (8% of the total number of applicants), the Chinese University of Hong Kong admitted about 1300 (10% of the total applicants) and the Polytechnic let in 360[8], making a total of only about 3000 students.

[8] 360 refers only to the number of students who follow degree courses.

Table 1.3
Number of candidates qualifying in school examinations

HKCE	1975	1980	1985
i school & private candidates	53,450	102,541	168,335
ii candidates obtaining 5 subjects at Grade E & above	26,281	46,000	75,700
iii (ii/i in %)	49.2	44.9	44.7
CUHK Matriculation/HK Higher Level Exam			
i school and private candidates	9,393	18,703	12,585
ii Matriculants[9]	2,785	5,004	2,681
(ii/i in %)	29.6	27.0	21.0
HKU Matriculation/HK Advanced Level Exam			
i school and private candidates	5,297	11,575	18,844
ii Matriculants	3,142	7,774	10,958
(ii/i in %)	59.3	67.2	58.0

Source: Adapted & Expanded from Table 2:3 of CRE

For Hong Kong students, one way to satisfy the stipulated requirements and to increase their chances of entering the university is to take the public examinations more than once. This has become a distinct

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[9]. The number of matriculants are those students who satisfy the minimum requirements for entry defined by each university. For CUHK, it is 5 Grade Es including Chinese and English languages and for HKU, it is 2 AL subjects (Grade E and above) and 2 OL (2 HKCE C Grades or above) or 3 AL passed.

feature of the educational scene in Hong Kong particularly at the HKCE level. Each year a vast number of students re-sit the public examinations. In 1980, there were about 121,000 candidates in HKCE but the Form V day school enrolment was only 66700. In 1986 the figure reached 156,000 and it far exceeded the day school enrolment of 77,287[10]. Even among the 77,287 day time students, 22.2% (17,158) of them were already repeaters. One researcher who attempted to analyze the results of the repeaters recorded the numbers of repeaters from 1985 to 1987 in HKCE (Table 1.4):

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[10]. 77,287 is the entry figure to CE examination used by C.C. Choi in his research paper, 'An Analysis of the Results of the HKCE Repeaters' delivered at the Fourth Annual Research Seminar of the Educational Research Association held at The Chinese University of Hong Kong from 28/11 to 29/11/1987. The day school enrolment recorded by the Education Department Half-Yearly Statistical Summary was 74,192, a difference of about 3000 pupils from Choi's figure. To be consistent, Choi's figure is used in this paper.

Table 1.4
Number of repeaters in HKCE

Source of Students	1985			1986			1987		
	No of repeater a	Total entry b	a / b x100%	No of repeater a	Total entry b	a / b x100%	No of repeater a	Total entry b	a / b x100%
Public sector day schools	5922	49417	11.98	6208	50099	12.39	6173	51434	12.00
Private day sch	11832	31224	37.89	10986	27188	40.41	11071	24939	44.39
Evening sch	13029	22477	57.97	11616	19695	58.98	11997	19819	60.53
Private candidate	50457	65217	77.37	45760	59537	76.86	43093	56993	75.61
Total	81240	168335	48.26	74570	156519	47.64	72334	153185	47.22

Source: Adapted from Table 1 of Choi C.C. (1987) A Analysis of the Results of the HKCE Repeaters

The above figures disclose that for the past three years from 1985 to 1987, almost half of the Form V students repeated at least one time in the HKCE - the gateway to matriculation classes and then higher learning in the universities. The highest record for repeating HKCE, according to the same researcher is eight times! It is probable that those who repeatedly sit for the HKCE do so in the hope of enhancing their chances of entering higher institutions.

What made the students of Hong Kong so keen on the pursuit of higher studies? In the setting of Hong Kong where economic interests dominate, are students affected by this atmosphere? Are students aware of their own

ability? Do the high ability students intend to invest more in higher learning? Are students conscious of the differences in earnings associated with different levels of education? Can one then go further to construct the expected life-time earnings of the students? To what extent do their intentions for continuous education affect their expected life-time earnings? Other than the quantity of learning, to what extent are their expected lifetime earnings affected by the quality of schools? What are the effects of socio-economic factors?

This thesis attempts to answer these questions and Hong Kong is used as a case for the investigation.

1.1 Related Studies in Hong Kong

Obviously, there are no easy and immediate answers to the above questions. In fact, very few studies have been devoted to examining the causes of the excessive demand for higher education in Hong Kong. Yip (1981) put up a private (social) demand model to explain the demand for education in general, but no attempt was made to develop the investigation to examine motivation. Based on the 1976 bi-census data, Hung (1982) used cost-benefit analysis to calculate both the social and

private rates of return to university education. He showed that investment in university education could yield a private rate of return of up to 25% and is higher than the social rate. Two years later, following a similar line of arguments and using both the 1976 bi-census and the 1981 census data, Kwok (1984) mobilized Mincer's experience model and found that investment in university education yielded a private rate of return of 22% in 1976 and 21% in 1981. At the more general education level, Chung (1988) compared the economic return to general and vocational education and discovered that although the private rate of return to the various fields of vocational and technical education varied, they were as a whole higher than general education. In 1976, they were 6.6% higher and in 1981 the difference was 11%.

These studies have, to a certain extent filled the vacuum of research in the understanding of the demand for education, in particular higher education in Hong Kong. But like many of the similar researches before, these studies largely approached the problem from the macro-level and assumed that there were economic motives behind the pursuit of education, in particular higher education in the students. Apparently, this is far from satisfactory.

1.2 The Study by Williams and Gordon and The Theme of The Present Study

In 1975, working under the Programme of Studies in Post-Compulsory Education of the Institute for Research and Development in Post-Compulsory Education of University of Lancaster, Gordon and Williams (1979) built up a case study on the individual demand for higher education in UK. Concerned with the stagnation of the demand for post-compulsory and higher education in UK after the late 60s, they injected economic factors, in particular the students' perceptions of the economic benefits from higher and further education into the analysis which provided the first example in Britain of an explicit quantitative study in this perspective. In Spring of 1977, Williams and Gordon (1981) undertook a similar study. Using the questionnaire technique, they gathered data from a sample of 2933 students in their final year of compulsory education attending 110 secondary schools in England. Again, they included economic factors in their analysis to explain the weakening individual desire in England and Wales for higher learning after compulsory education. In this study they also estimated the internal rate of return.

Williams and Gordon injected economic factors in the analysis for the falling demand for higher education in England and Wales. The model could be equally applicable to study the rising demand for higher education in Hong Kong. In particular the following issues could be investigated:

A. The influence of students' economic motive in the pursuit of higher education.

B. The pattern of the demand for higher education from the expectations of the individuals.

C. The analysis of earnings functions as perceived by students who are about to enter full-time working, post-secondary[11] or university education.

D. The evidence of the link between the private rates of return and the demand for higher education.

In addition, the following issues though not directly related with Williams and Gordon study will also be examined:

E. The extent of students' awareness of their own ability and

F. The different patterns of the demand for higher education among students of different abilities.

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[11] Post-secondary education broadly includes A level study (two years), teachers training in Colleges of Education (two to three years) and certificate courses in the two Polytechnics (two to three years).

Hence in the present study, the economic factors in the individual's demand for higher education in Hong Kong will be investigated. Students' perception of economic benefits from higher learning will be explored. Whether students are aware of their own ability and the effects of different abilities on the demand for higher learning will be examined. Estimates will be made of the expected lifetime earnings of students with different careers intentions so that the internal rates of return to different levels of education could be calculated. To obtain a deeper understanding, the analysis will cover the abilities and the socio-economic and educational backgrounds of the individuals.

Perhaps it is necessary to point out here that though relying on both Human Capital and Screening/Signalling theories as analytical tools, it is not the purpose of the paper to settle the disputes between the two theories. Rather, using Hong Kong's case as an example, it tries to show that the two theories can apply to situations where they could be seen as complementing each other.

1.3 Organization of The Thesis

The remaining chapters of the thesis are organized in the following way:

Chapter 2 gives a brief account of the Hong Kong education system and highlights the selective nature of the system since the 1950s. It is argued that this allocation of students into institutions of different qualities affects students' demand for higher education and their expected life-time earnings.

Chapter 3 reviews the literature on Human Capital and the Screening/Signalling Hypotheses. Three similar cases on the studies of *ex ante* Rates of Return will be discussed.

Chapter 4 examines at some length the study by Williams and Gordon and compares 2 different ways the perceived lifetime earnings data are collected. It highlights the areas of investigations, gives the definitions of the variables in the analysis and describes how the data of the thesis are collected.

Chapter 5 examines the economic motives of the students for higher education and analyzes the factors which

affect the demand for higher education. It examines also whether students are aware of their ability and whether students of high ability will invest more in higher education.

Chapter 6 compares the actual earnings in the market with expected earnings of students and employs regression analysis to examine the different independent variables on the expected lifetime earnings of students of different careers intentions and abilities. The regressions will be further broken down according to different abilities, different quality of schools and social background for greater analysis. Estimate will be made on the perceived internal rates of return to higher education in Hong Kong as well as overseas.

Chapter 7 discusses the findings and the limitations of the research. Some conclusions will also be drawn from the present study.

CHAPTER 2 BACKGROUND

2.0 Introduction

This chapter gives a brief sketch of the Hong Kong education system as background information. It then describes in details the development of the selective nature of the education system. It traces the origin of the Secondary School Entrance Examination and depicts how it gradually evolved over the years. SSEE was later replaced by the Secondary School Places Allocation (SSPA) but the selective nature of the system did not change. The quality of the secondary schools were developed over the years.

2.1 The Hong Kong Education System

Being a British colony, Hong Kong models most of its administrations on the United Kingdom. The Hong Kong education system is no exception. The structure of the education system from primary to university is basically similar to that of England and Wales. Primary education begins normally at the age of 6 (after 1980 it is down to 5 years 8 months). It is a six year programme and is

conducted in bisessional schools. According to the Annual Summary of the Education Department, 1985-86, Table 1b, in 1986, about 7% (38,986) of the primary students were enroled in Anglo-Chinese schools where the medium of instruction is largely English, the remaining 93% (491,694) were in Chinese medium schools[12]. However, both types of primary schools follow a similar curriculum which is basically the teaching of the 3 Rs. For a long time, at the end of Primary Six, students had to sit for the Secondary Schools Entrance Examination (similar to the former eleven plus examination of England). After 1978, this was replaced by the Secondary Schools Places Allocation, an aptitude test which examines the language (Chinese) and mathematics abilities of the students. According to the results of this test, students are assigned to secondary schools of different qualities. Since 1971, primary education became free and the attendance rate was close to 100 per cent.

Secondary education is five years and is divided into three years junior secondary (Form/Middle 1 to III) and two years senior secondary (Form/Middle IV to V).

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12. The English primary and secondary schools which cater to the children of the expatriates are not included in the calculation.

There are three ways of classifying the secondary school education: according to the Teaching Curriculum, the Medium of Instruction or the Financial mode of Schools.

In March, 1986 over 92% (364,836) of the secondary students (Form/Middle I to V) were in 'grammar' schools which teach academic subjects like History, Geography, Economics and Public Affairs, Integrated Science .... other than the 3 basic subjects of Chinese, English and Mathematics. About 8% (30,853) were in technical and pre-vocational schools where the syllabi cover more practical subjects. Pre-vocational education is concentrated in the junior secondary level. Of the grammar schools, 90% of them were Anglo-Chinese schools which normally use English as the medium of instruction, the remaining 10% were Chinese Middle schools where the medium of instruction is Chinese[13]. In terms of the teaching medium, the technical and pre-vocational schools are categorized as Anglo-Chinese schools. In 1986, about 72.72% (287,749) of the secondary school students were in Government and Government Aided secondary schools (Form/Middle I to Form/Middle V) where

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[13]. In 1987, the Education Department abolished the difference between the Anglo-chinese and Chinese Middle School. From September 1988 onwards, these schools will be referred to simply as secondary schools. The Pre-vocational schools remain unchanged.

the main cost of education is borne by the government; 16% (63,496) were in government 'bought places' in about 50 Private Independent Schools (Form/Middle I to III), the fees of which are controlled by the government; the remaining 11.28% (44,444) were in senior education (Form/Middle IV & V) in the Private Independent Schools which are self-financed and the school fees are borne by the parents (Annual Summary, Education Department, 1985-86).

In 1979, junior secondary education was made free and compulsory. In order to allocate students into Form/Middle IV, a test known as the Junior Secondary Education Assessment (JSEA) was imposed which examines the attainment of the students in English, Chinese and Mathematics[14]. In 1986, about 60% of the Secondary III students were assigned places in Secondary IV in government and aided schools. Of the remaining, the majority were enroled in Private Independent Schools and about 3% enroled into the 5 Technical Institutes in craft course.

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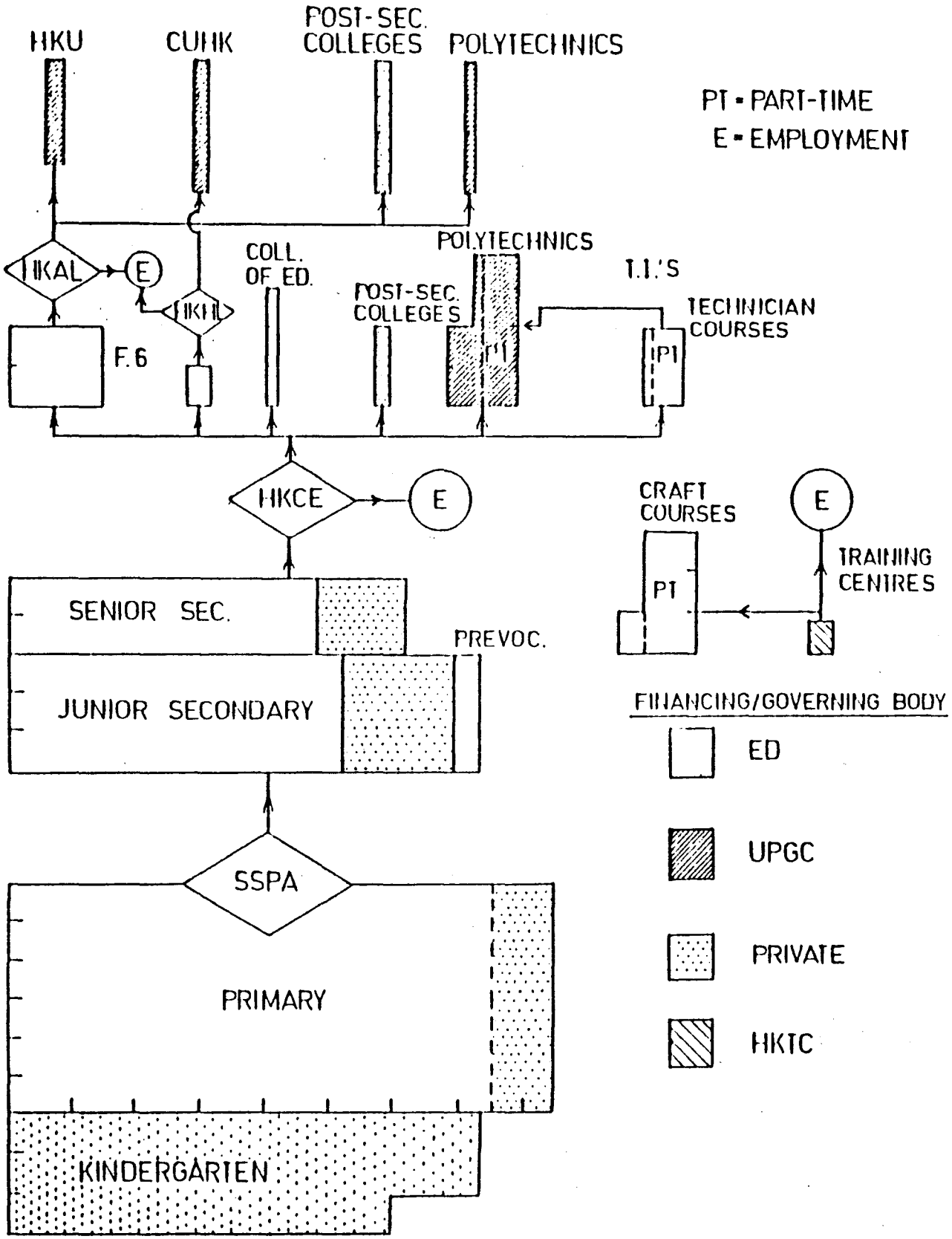
[14] In 1986, the writer suggested to use Mean Eligibility Rate (the average passing rate of a school in JSEA in the past three years) to replace the JSEA. This suggestion was accepted and JSEA was phased out in 1988.

Figure 2.1

Education System of Hong Kong as at 1980



Source: Cheng Kai Ming (1987)

At the end of secondary education, students sit for the Hong Kong Certificate of Education (HKCE) which is equivalent to GCE O Level. After Form V, the majority of students who are qualified follow a two-year Matriculation course leading to Advanced Level Examination (AL). Most of the tertiary institutions offer three year degree courses and accept students based on the AL results[15]. There is also the one year Middle VI course which prepares students for High Level Examination (HL) for the Chinese University of Hong Kong which runs a four year degree course. Government policy since 1979 has been to provide Form VI education to one third of those who enroled in Form IV two years ago.

University education is very competitive. In 1987, the total number of intake by the 8 subsidized higher

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[15]. In 1987, the higher institutes under University and Polytechnic Committee (UPGC) which offer three years degree courses include:

University of Hong Kong
Hong Kong Polytechnic,
City Polytechnic of Hong Kong,
Hong Kong Baptist College

The higher institutes which offer four years degree courses include:

Chinese University of Hong Kong	(under UPGC)
Lingnam College	(government subvented post-secondary college)
Shue Yan College	(private post-secondary college)

institutions stood at 12130. Among this figure, 5,469 were following a degree course (Education Commission Report No 3, Annex D). The figure for degree course is about 5% of the relevant age bracket.

2.2 The Selective Nature of The Education System

Though the education system of Hong Kong is similar to that of England and Wales, the historical development of Hong Kong and the traditional Chinese value on education have stamped certain features on the educational scene making it unique to Hong Kong.

One of these features is the selective nature of the system and the heavy weighting put on public examinations for the purpose of selection[16]. As a consequence, schools of different qualities based on students' abilities emerged. A detailed description of the selective nature and procedure of the educational system is included below to give a picture of how the schools in Hong Kong have gradually evolved to be

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[16]. This feature has continuously drawn criticisms from the educationalist (e.g. the OECD Visiting Panel's Report, 1982, p.37-38 and Wong, 1987).

different in quality.

The early selection of students takes place when students enter secondary school education. The measure was first introduced in the 1950s and was a result of, in the words of the present Director of the Education Department, the 'necessary conditions' of the time[17].

In 1949 when the Communist regime was established in China, Hong Kong was flooded with immigrants from China. The population of Hong Kong jumped from a mere 1,750,000 in 1947 to 3,863,900 in 1969[18]. Today it is well over 5 million. Before 1950, the demand for education was slim. The 1954-55 Annual Departmental Report by the Director of Education reported the low application to the training colleges:

> The number of applicants for entry in September, 1946 was disappointingly small and much of the material of inferior quality..... A college less than half-full cannot expect that lively activity inseparable from proper training and it will remain less than half-full unless young men and women find teaching an attractive profession which at present,

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17. Li, Y.T. (1979), 'The Development of Hong Kong Education System', a speech given to the principals of secondary schools in a seminar organized by the Education Department at Grantham College, November, 1979.

18. Figures obtained from Hong Kong Government Year Books and the Census and Statistics Department.

they most certainly do not.

This was no longer the picture in the 1950s. The rapid increase of population had created a heavy demand for education many times more than the pre-1950 period. Table 1 records the changes in the number of day-time students in government, aided and private schools in the primary and secondary level from 1950 to 1985.

Several characteristics can be observed in Table 2.1. First, the provision of education for all in primary and then secondary school was a gradual and long process. Second, over the years, the provision of education in both the primary and secondary levels relied heavily on places in the Private Independent Schools. For example, in 1965, the existing policy then was 'to provide in government, aided and selected private schools secondary education to School Certificate (ie Form/Middle V) level for about 15 per cent of all pupils who completed the primary school courses; and to encourage voluntary and private agencies to supplement this provision.' (The Hong Kong Education System, 1981). The private schools began to decline after government started to expand public education. At the primary level, the peak number of private schools was in 1964. After that, it began to decline first

gradually, then accelerated in the late 70s. At the secondary level, the peak was in 1978. Entering the 80s, the fall became very rapid.

Table 2.1
Students population in day school 1950 - 1985

YEAR	PRIMARY SCHOOL						SECONDARY SCHOOL			
	Govn't	Aided	Private	Total	Primary 6/Form 1		Govn't	Aided	Private	Total
1950[d]	5755	34866	79935	120556			2927	6739	16832	26498
1951[b]	7570	37257	87283	153706			3451	7259	23592	27043
1952	8221	45344	97986	151551	data not		4057	7997	27518	39572
1953	7461	46181	100064	153706	available		6751	8863	27973	43587
1954	8643	52622	109564	170829			7105	8935	31774	48414
1955[c]	11463	59007	119465	189935			7426	10066	34290	51782
1957	19541	82175	143891	245607	17200	/10686	6012	12276	37186	55141
1959	37224	110027	166467	313718	31075	/17556	7094	15050	47858	68785
1960	52552	134994	191293	378839	38897	/20872	8155	17222	50694	74113
1961	62410	158861	216473	437744	48350	/26407	7958	18943	61793	87463
1962	65569	189651	238547	504928	58410	/34127	10595	21210	77343	106438
1963[d]	77168	215500	253930	556628	64602	/39720	12763	23281	94198	127137
1964	79388	236555	263863	585926	70008	/50802	17097	26206	113942	157245
1965[e]	81791	256916	261902	604648	69930	/52477	17421	27948	127549	172918
1966	84418	311795	234191	636455	72144	/52618	16914	31483	140798	189195
1967	85020	342937	231532	661957	75436	/57661	17626	34916	158538	211080
1968	83436	373510	238231	696176	79493	/64147	18346	36753	166063	221152
1969	80511	398634	220799	725672	74305	/68680	18579	38363	179357	236299
1970	80487	440468	202521	723467	80099	/52727	18702	44041	178102	240844
1971	77389	469725	192505	739619	93245	/63430	19848	49739	184865	258849
1972	70820	500084	169040	739944	103996	/73907	20363	55173	198948	274484
1973[f]	62469	513938	148765	725172	110906	/83290	14934	41876	184401	259894
1974[g]	54990	520418	129128	704536	113848	/89275	15880	50515	201889	287063
1975	48637	517523	111259	677421	113125	/96862	16761	57136	231347	323933
1976	42173	504310	96128	642611	111427	/96570	17211	62653	254155	352698
1977[h]	35990	484078	86792	606900	108273	/99943	18868	88984	269766	377618
1978[i]	31153	464631	79038	574822	106286	/103529	21549	99027	281802	402378
1979	30416	448230	74884	553530	96599	/109132	23734	147868	255891	427493
1980	30822	444595	69256	544673	90777	/100438	24523	156576	248296	429395
1981	31653	442691	67074	541418	86104	/95506	25525	160818	245966	432323
1982[j]	33629	440694	65222	539500	84268	/90997	27096	168184	232854	428135
1983	34354	444161	61507	540022	83907	/89622	29099	243796	147531	420426
1984[k]	35736	446187	58672	549595	87656	/88347	34616	276761	136436	447813
1985	36770	444074	56301	537345	88129	/91380	35437	283528	125556	444521

Source: Compiled from the Summary Reports, Education Department, 1951-1986

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a. From 1950 to 1969, the figures include evening school students.

b. Starting from 1951, technical (vocational) school students were included in the secondary schools.

c. Data of 1956 and 1958 not included.

d. From 1963, a special secondary course and a 3-year Non-certificate Course were introduced. The former was phased out 3 years later and the latter in 1979.

From 1964, a 5-year primary education course was introduced which co-existed with the 6-year course. The new course proved to be very unpopular and was abandoned in 1969.

e. Release of The White Paper: Education Policy.

f. Release of the Green Paper: Report of the Board of Education on the Proposed Expansion of Secondary School Education over the Next Decade.

g. Release of the White Paper: Secondary Education in Hong Kong over the Next Decade.

h. Release of the Green Paper: Senior Secondary and Tertiary Education : A Development Programme for Hong Kong over the Next Decade.

i. Release of the White Paper: The Development of Senior Secondary and Tertiary Education.

j. Release of the Report by the OECD Visiting Panel: A Perspective on Education in Hong Kong.

k. Formation of the Education Commission in February.

Release of Education Commission Report No 1.

In summary, Hong Kong has undergone rapid economic changes since 1950. From a city founded on entrepot trade, Hong Kong has become an export oriented industrial and financial centre. The economic policy of the day, other than the non-interference strategy which helped to promote trade and export, was the vigorous pursuit of economic growth and the maximization of profits. The government also persistently adopted a conservative estimation of revenue which resulted in continuous surplus over the years. One critic[19] commented on Hong Kong government's conservatism in 1971:

> 'When a budget, which is already small in relation to the national income of the country, bears the weight of long-term investment in the public sector as well as yielding substantial surpluses, it is inevitable that certain socially necessary services will be under-provided'

One of the 'socially necessary services' which was under-provided was education. While after World War II, many newly independent and developing countries experienced a rapid expansion of education, Table 1

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19. Owen, N.C. (1971). Economic Policy in Hong Kong in K. Hopkins (ed.) Hong Kong: The Industrial Colony, Oxford University Press, Hong Kong, p179.

illustrates that the provision of education in Hong Kong since 1950 has been a slow process. It took 22 years to reach full provision for all in the primary while in the junior secondary, the period was 31 years. This slow provision of schooling particularly in the secondary level made admission to the government and aided schools very difficult. Under these circumstances, the selection through public examination was introduced and justified.

2.3 The development of the Secondary Schools Entrance Examination

The selective examination (later on it became the Secondary School Entrance Examination) was first brought in by the government schools. Concerned about educational standards and faced with a growing number of primary school graduates who competed for places in the limited places in government schools, the Education Department introduced the Joint Primary 6 Examination for all primary 6 pupils in the government schools in the 1950s. This was gradually extended to some grant-in-aid primary schools and selected pupils in subsidized

and private primary schools[20]. Admission to government secondary schools and to a lesser extent, aided secondary schools was based on the result of this Examination (HK Education Department Annual Summary, 1959-60).

In 1962, the Joint Primary 6 Examination was formally replaced by the Secondary School Entrance Examination (hereafter SSEE) which was intended for all the primary 6 students on a gradual basis. The Hong Kong Education Department Annual Summary, 1962-63 stated the intention:

> The Secondary School Entrance Examination was held for the first time in 1962 for selection of pupils for promotion to secondary school places. This examination is open to many more pupils in private primary schools than the Joint Primary 6 Examination it has replaced. Heads of all registered primary schools were allowed to enter up to 60%, and, in cases where past examination results justified, up to 100% of their primary 6 pupils. The examination was also much simpler than the Joint Primary 6 Examination so that it consisted only of one paper each in Chinese, English and Arithmetic and was completed in one day as against four days[21].

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20. The Grant-in-Aid and Subsidized schools were different in the modes of aids given by the government and was referred to broadly as Aided Schools or Government-aided Schools.

21 The government has always been vague about the nature of the SSEE. It was not until 1978 that the selective and competitive nature of the SSEE was acknowledged by the government in the White Paper on The Development of Senior Secondary and Tertiary Education (1978, p1)

Like the previous Joint Primary 6 Examination, from the start, the three subjects of Chinese, English and Arithmetic in SSEE were attainment tests. Only a small percentage of the participating students passed this examination (until 1970 it was around 30%) and were selected to study in the government, government-aided and private assisted[22] secondary schools. Table 2.2 lists the number of primary 6 students from 1968 to 1976, (column 1), Form I students (column 2), participants (column 3), allocated students (column 4),

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which said:

'...The expansion of subsidized primary education at a faster pace than secondary education has enabled most of the younger generation in Hong Kong to receive a basic education and to master essential skills of literacy and numeracy, but it led to severe competition for secondary school places in the public sector, which has exerted an unhealthy influence on primary school teaching.'

22. Different from the Government-Aided Schools which received all current and recurrent expenditures from the government, the Private-Assisted Schools received only a capitation grant from the government. In the late 1970s when junior secondary education was rapidly expanded, the government incorporated the majority of the Private-Assisted Schools (37 out of 41) into Government-Aided Schools.

The Private-Assisted Schools are different from the Private Independent Schools as the former have to register as non-profit making bodies while the latter are not required to do so.

the successful rate against participants (column 5) and the successful rate against the number of Primary 6 students (column 6). The table gives a picture of the severe competitiveness of the examination:

Table 2.2
Secondary School Entrance Examination 1962-1978

Year	(1) No of Primary 6 students	(2) No of Form 1 students	(3) No of Partici-pants	(4) No Allocated	(5) (4)/(3) in %	(6) (4)/(1) in %
1958	/	/	7573	2441	32	
1959	31075	17556	10246	2542	25	8.4
1960	38897	20872	13466	3295	25	8.5
1961	48350	26407	17134	8169	48	16.8
1962	58410	34127	25966	7781	30	13.3
1963	64602	39720	25662	8068	31	12.5
1964	70008	30517	28535	8013	28	11.4
1965	69930	38981	29144	8900	30	12.7
1966	72144	43161	30140	10027	33	13.9
1967	75436	47361	33245	10970	33	14.5
1968	71999	48048	35932	11498	32	16.0
1969	67405	51825	38566	13498	35	20.0
1970	80099	50686	54762	16428	30	20.5
1971	93245	60742	68301	24588	36	26.4
1972	103996	71349	79156	35620	45	34.3
1973	110906	77694	87374	41939	48	37.8
1974	114100	94800	93501	46750	50	41.0
1975	113000	90100	96117	49019	51	43.3
1976	111400	96200	97930	63654	65	57.1

Source: Compiled from Secondary School Entrance Examination annual Reports 1962 to 1976[23]

[23]. These Annual Reports were restricted materials and were made available to the writer for the present study with the kind permission of the Education Department.

Despite its highly competitive and selective nature, the SSEE Annual Report observed that 'The general public and parents of pupils seem to have learned more about the nature of this examination and the purposes it aims to serve and have accepted it as something that cannot be dispensed with under the present conditions.' (The SSEE Annual Report, 1963, p1). From 1962 until the early 1970s, only around 30% of the participating students were successful in gaining an aided place in the Government, Aided or Private-Assisted Schools (Table 2 Column 5). If the figure was pitched against the total population of primary 6 students, the percentage fell to around 13 to 14% before 1967 and rose more rapidly after 1968. The successful students were then arranged in order of merit and were given a choice of Anglo-Chinese schools in Government and Aided secondary schools (in the jargon of the Education Department, this was referred to as the 'G' places) and Private-Assisted Schools where the medium of instruction was English (the 'P' places) and the Chinese Middle Schools also in Government and Aided secondary schools (the 'M' places) where the medium of instruction was Chinese. The choice of the students had always been first the Anglo-Chinese Government and Aided Schools, followed by the Private-Assisted Schools where the

medium of instruction was also English and lastly the Chinese Middle Schools (Secondary School Entrance Examination Annual Reports 1962 to 1976).

All these schools offered grammar education. In the early period, only the government schools provided technical education for the successful candidates, but the number was negligible. Pre-vocational education of any large scale after Primary 6 was only gradually introduced after the 1970s. However, the pre-vocational schools which were mainly geared towards junior secondary education in practical subjects have never been popular with the pupils and the parents.

It was clear then in the early part of the SSEE history, the medium of instruction in secondary schools became the criterion of 'selection' for the academically capable students (later on when technical and pre-vocational education were available, it was the medium of instruction plus grammar education). The great majority of those who failed the Examination and those who were not selected in the first place to sit for the Examination simply ended up in the labour market[24] or if

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[24] The child labour law which forbids children under 14 to work was not enacted until the introduction of free and compulsory education in 1979.

their families could afford it, studied in the Private Independent Schools where teacher qualifications, school facilities and teaching standard were low.

Over the years, elaborate methods had been applied to allocate the successful candidates to the Government, Aided and Private-Assisted secondary schools. At first, when the number of pupils was small, strict order of merits was followed. Gradually, when the number of candidates became quite large, a block system was introduced. The idea was to group students of approximately equal ability into a block. In 1971, in order to speed up the provision of junior secondary education, a 3-year assisted places scheme was introduced in the Private-Assisted secondary schools (the 'P 3' places). Later on 'P 3' places were also available in the Government and Aided secondary schools for the less academically capable students.

The block system went through various revisions over the years. In 1975, instead of uneven numbers of candidates in the blocks, the candidates who were given five-year places were grouped into five blocks, labelled X1, X2, X3, X4 and X5 each containing approximately equal number (3600) of candidates; those who were eligible for three-year places formed two blocks, Y1 and

Y2 each with about 15000 pupils and the remainder (who were not allocated places) were placed in five blocks Z1, Z2, Z3, Z4 and Z5 each with about 9600 pupils (Secondary School Entrance Examination Annual Reports 1962 to 1977).

A government report prepared for the OECD Panel of Visitors in 1981 described briefly the operation of SSEE and reported the criticisms made on it (The Hong Kong Education System, 1981, p178-79):

> 'Until 1977 the selection of pupils for the then limited number of public-sector secondary school places was by public examination - the Secondary School Entrance Examination (SSEE). All candidates were required to take the examination in three basic subjects - Chinese, English and Mathematics - in one afternoon. Allocation was carried out in "bands" in which parents' first choices were considered in strict order of merit, judged solely by performance in the SSEE. Before its abolition the SSEE was criticized on the grounds that it led to cramming in the three main academic subjects to the neglect of other areas of the curriculum, thus distorting the aims of primary education; the fact that it was a public examination created widespread anxiety among children (and their parents); a child's future education was determined at the age of 11 in one single afternoon; and it led to certain secondary schools getting most of the academically able pupils.'

The SSEE system ceased operation after the 9-year free and compulsory education was introduced in 1979. In order to provide for sufficient number of Form I places,

several devices which included flotation classes[25] in the Government and Aided schools, school-building programme and buying places from the Private Independent Schools were employed (1974 White Paper: Secondary Education in Hong Kong Over The Next Decade). However, the SSEE system was not scrapped but only replaced by another one titled 'Secondary School Places Allocation' (hereafter SSPA) system because it was believed that a wide variety of secondary schools existed and the standard among them was uneven. Instead of the three academic subjects, the SSPA relied on Aptitude Tests to measure students' linguistic (Chinese) and numerical abilities.

Under the new system, students were grouped into 5 Bands of abilities in the 19 districts in Hong Kong. The Band 1 students who had the highest scores in the SSPA had the priority of choosing schools first and almost all chose the 'prestigious' Government and Aided grammar schools. On the contrary, the majority of the Band 5 students who scored the lowest in SSPA ended up mostly in the Private Independent Schools. Since 1978, it has

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[25] It means that a school with X classrooms will operate X + Y classes. The Y classes will use the classrooms of those who are engaged in PE lessons in the sport-ground or in laboratory work in the laboratories.

been the policy of the government to expand the aided schools sector with the result that many of the Band 5 students also end up in the aided secondary schools. This is particularly so in the new towns. So basically the selective nature of the system is retained in SSPA and the quality difference between schools, in particular Aided and Private Independent Schools remains.

2.4 Effect of SSEA & SSPA and The Quality of schools

It is clear from the development over the years that the SSEE and SSPA have created a distinct difference between Aided and Government secondary schools on one hand and Private Independent secondary schools on the other. Not only that the Government and Aided secondary schools have the better quality students, but due to the set standard requirements laid down by the government in terms of teacher qualification, teacher ratio, class size and building, the Government and Aided secondary schools are better also in facilities. On the contrary, not only are the Private Independent secondary schools allocated students of low ability, their low requirements for teacher

qualifications, poor teacher ratio, large class size and inferior building all contribute to their overall substandard in facilities as well. On top of all these, it has been the government's policy to keep the school fees of private schools well below the cost of education to the government and aided schools[26] thus making it very difficult for the private schools to improve their quality.

However, since the late 1970s, the Government began to rapidly expand the aided secondary schools (refer to Table 2.1). The private schools sector began to contract. In some new towns, there were only a few, if any, private schools. Many of the aided schools had to take in students of low banding. This somehow blurred the distinction between private independent schools and some aided schools.

This grouping of students strictly according to ability resembles the 'sponsored' mobility[27] described

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[26]. In 1985, the South China Morning Post revealed that the average cost of an aided secondary school to the government was HK$8,000 while a private secondary school (through the brought place scheme) was only HK$3,000.

[27]. This is a concept created by Turner (1960) in contrasting the social culture and tradition of England and the United States. Contrary to the 'sponsored' mobility of England, the US

by Turner (1960). Yuchtman & Samuel (1975) showed that in a system where 'sponsored' mobility prevails, the institutional factor is significantly stronger than interpersonal factors in affecting the pursuit of higher learning. Among other things, it is believed that the quality of schools - the distinct feature of the educational system of Hong Kong, exercises immense influence on the intention of students for higher education.

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system is labelled the 'contest' mobility.

CHAPTER 3 REVIEW OF LITERATURE

3.0 Introduction

This chapter is divided into three sections. The early part of the first section traces briefly some of the important aspects and developments of Human Capital theory. It highlights the productivity augmenting view of the theory; describes Becker's specific and general training and the latter's relation with schooling. In the later part of application, it introduces the earnings function, the independent variables and the limitations in collecting the data of these variables. It discusses studies on the quality of schooling and ability adjustment - two of the important variables included in the present study. Lastly it states the general methods in calculating the rate of return to education.

The second section deals with the Signalling/ Screening Hypothesis. It starts by defining the scope of the argument within the neo-classical school of economics. It introduces the theory of signalling which sees the accumulation of educational credentials by students as a way of signalling their ability to the

potential employers. The concept of employers' conditional probabilistic beliefs, the informational feedback loop and the numerical explanation are presented. It shows the arguments that it is the capable students who would invest in more and more education for their future gains. Lastly the work of Riley, an influential proponent of the Screening/Signalling Hypothesis is briefly introduced.

The third section summaries three pieces of study on *ex ante* rates of return. The one by Williams and Gordon, upon which the present study is built, is an original research of a large scope with a sophisticated methodology. The work by Bosworth and Ford is included because of its discussion on the ways the lifetime earnings are estimated. The works by Psacharopoulos and Sanyal draw on data in developing countries and are therefore included for comparison.

3.1 The Development of Human Capital Theory

The study of students' perceived internal rate of return to education falls into the scope of Human Capital Theory. The concept of human capital investment which Mark Blaug (1976) defined as "the idea that people

spend on themselves in diverse ways, not for the sake of present enjoyments, but for the sake of future pecuniary and nonpecuniary returns" is not a new one, nor is it confined to education alone. Economists[28] have pointed out that as early as the 18th century, Adam Smith already called attention to the idea that an educated man was a sort of expensive machine.

In the 1950s interests in the subject rapidly grew and economists in UK and Europe already drew notice to the concept of education as an investment[29]. In 1960,

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28. see for example

Bowman, M.J. (1968). The Human Investment Revolution in Economic Thought, in M. Blaug (eds) Economics of Education, Vol 1, Penguin Books: 101-34,

Blaug, M. (1970). An Introduction to the Economics of Education, Allen Lane, p2 and

M. Woodhall (1987) 'Economics of Education: A Review" in G Psacharopoulos (ed.) Economics of Education Research and Studies, Pergamon Press: 1-8.

29. Williams (1982) observed that in the second half of 1950s, there had already been some writings on education by economists in Europe. *The Cost of Education* by John Vaizey appeared in 1958. Friedrich Edding published in Germany in 1958 his study *International Trends in Educational Expenditure* and an article titled 'Investment in Human Capital' which made some use of the concept of education as an investment by Gareth Williams published in the Cambridge University Political Economy Club also appeared in 1958.

Theodore Schultz delivered his presidential address 'Investment in Human Capital' (Schultz, 1961) and the birth of the subject was considered properly heralded. In the lecture, Schultz dispelled the deep-seated moral and philosophical taboo of treating human beings as capital goods; established the link of economic growth with human capital and analyzed the different categories of human investments which included a) health, b) on-the-job training, c) formal education, d) study programme for adult in agriculture and e) migration. After that, for some years interests in the economics of education mushroomed throughout the world and stimulated a profusion of research and policy proposals. The much quoted bibliography by Mark Blaug is a good case in point. In 1966 when Mark Blaug first compiled the bibliography on economics of education, there were only 800 items. In 1970 it was expanded to 1350 and the third edition in 1978 contained over 2000 entries. Bowman (1966) in an article to review and advocate the human capital theory described the concept of investment in human beings as 'something of a revolution in economic thought'. From 1960 to early 1970, Human Capital theory was at the height of its fame. However, since the mid 1970s, the interest in Human Capital theory has subsided.

3.11 The productivity augmenting view

Much of the early work in the economics of education[30], observed Hansen (1970) concentrated on two underlying themes:

(1) there are important links between education and productivity - and therefore income[31] and

(2) the role of education can be explored fruitfully when viewed as an income-generating form of human capital[32].

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30. John Mace (1984) tried to differentiate Human Capital Theory from economics of education. For the former, he borrows a definition from Mark Blaug (1976) which states that human capital 'is the idea that people spend on themselves in diverse ways, not for the sake of present enjoyments, but for the sake of future pecuniary and nonpecuniary returns'. For economics of education he defined broadly as the application of the analytical tools of economics to education. Williams (1982) pointed out that it is Human Capital Theory which is the heart of the economics of education.

31. The neoclassical economic theory argues that wages are determined according to the worker's marginal contribution to the revenues of the firm, hence more productive workers will have higher income.

32. Incidently much of the criticism on the use of education per man indexes as measures of the quality of the labour force also lies in the two basic questions (Griliches 1970, p80):

    (1) Does education 'really' affect productivity ? and

This productivity augmenting view of schooling is the 'classic stance' of the human capital concept and has generated studies on the effect of education on economic growth. Denison (1962) was among the pioneers in the use of a production-function model[33] to quantify the contribution of education (the changing distribution of school years) to economic growth in the US[34]. However, it has not been easy in establishing direct evidence for the productivity augmenting view of education. Thus far, the only direct evidence came from the agricultural sector. In the survey of 18 studies conducted in developing countries, Lockheed et al (1980)

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(2) Is 'education' and its contribution measured correctly for the purpose in hand?

33. Blaug (1970, p93) pointed out that Denison never mentioned the concept of a production function in his book. Hence Denison can only be said to have implicitly estimated an aggregate production function.

34. Bowman (1980) drew from a number studies to compose a comparison of Education in Growth Accounting, 1952-62 among a number of countries. She observed that for most countries education turned to be a minor factor (her Table 3 p54). This was due to a) the omission of educational 'maintenance' component in all these studies and b) where there has been substantial structural change, the calculation underestimates contributions of human resources to economic growth.

were able to show that as a result of a farmer's completing 4 additional years of elementary education, farm productivity increases, on the average, by 7.4%.

3.12 Specific training, general training and schooling

In 1964, Gary Becker published in the supplement volume of the Journal of Political Economy his 'Human Capital' which deals with investment in on-the-job training and who will benefit therefrom. This key volume greatly advanced Human Capital Theory.

Before, it used to be believed that most forgone earnings (human capital investments) occurred in the schooling period. Bowman (1987) pointed out that schooling constitutes only one element in Human Capital Theory. Gary Becker (1962, 1975) argued that investments in human beings took place also throughout the postschool years. The theory was further developed by Mincer (1962, 1974). The concepts of the general and specific training are distinguished as follows (Becker, 1975):

a) general training - portable and includes training like literacy, numeracy and general skills like carpentry, clerical work, cookery or hair dressing; even specialized skill like

heart surgery is portable when it is not limited in the hospital in which the surgeon is trained;

b) specific training - nonportable which enhances the future productivity of the trainer in the firm which provides it; this includes orientation programme and rotation work among departments.

In fact, few people would acquire specific human capital without at the same time acquiring at least some form of general human capital. These specific Job-training investments would decline over a period of time. The individual would switch gradually from learning at a younger age to earnings at an older age until the investments reach zero, forming a concave lifetime earning profile. However, it is not always easy to distinguish general training from specific one when the labour markets are not perfect. Ziderman (1978) commented:

> Training provided under monopsony conditions, even if general in essence, becomes firm-specific in reality; conversely, training that may have been *de facto* specific will be rendered general by competitive entry. It is the potential mobility of trainees, not the generality of skills, as such that is critical to the training-investment decision of a firm.

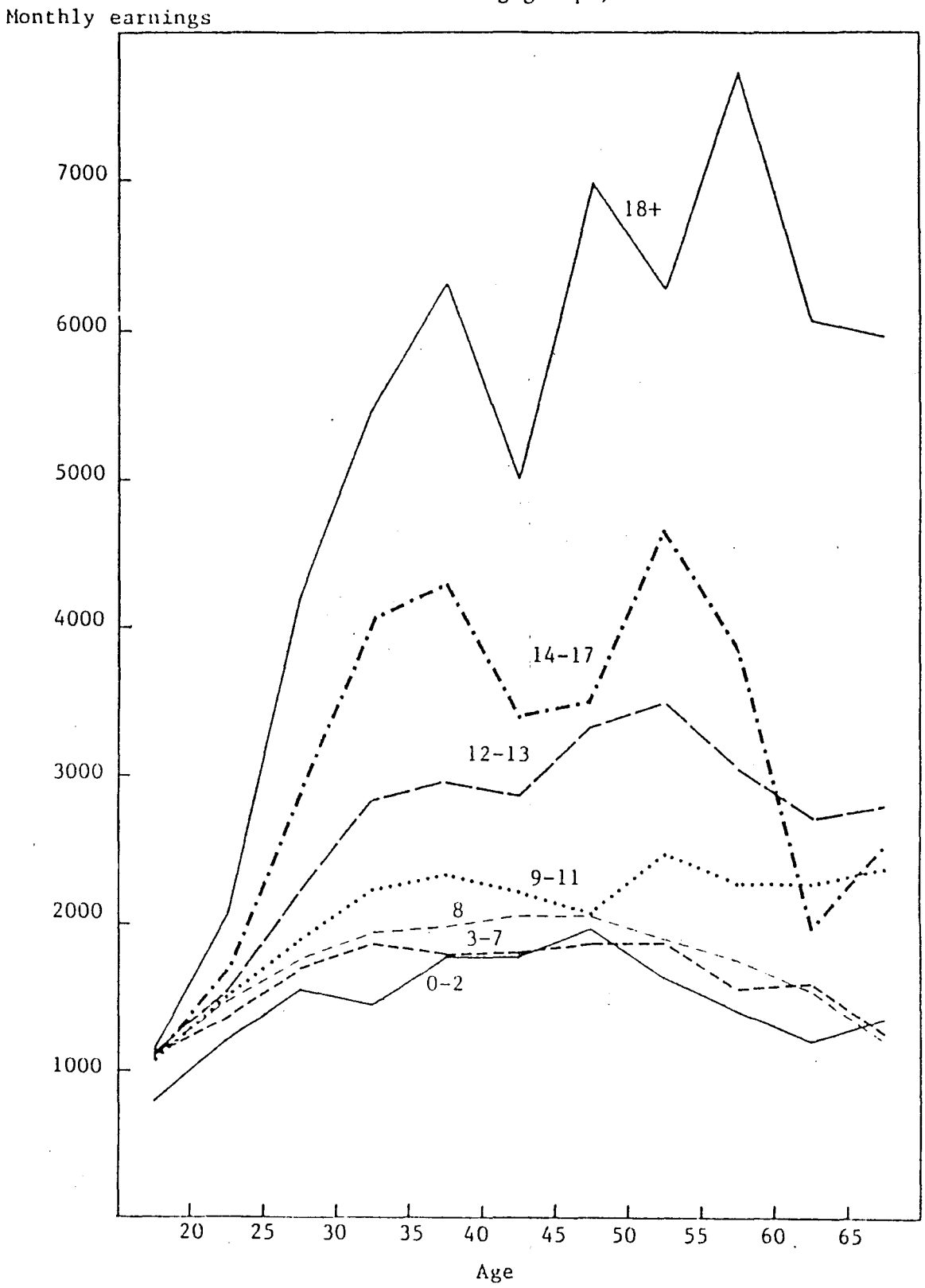
Japan, where the development of customs have constrained employee mobility between firms is frequently cited as

an example on the discussion of specific human capital (Bowman, 1987). Blaug (1983) lauded Becker's model for opening up new vistas in labour economics. But despite Becker and Mincer's contributions of on-the-job training to Human Capital Theory, the failure to generate a testable theory has caused the bulk of the work in the human capital research programme to continue to focus on the investment value of education (Blaug, 1976).

Schooling, according to Becker's model, is but a special case of opportunity-cost investment in oneself. Since employers are interested only in specific training and will have no incentive in the provision of general training, the costs of general training, both real and 'opportunity' have to be borne either by the government as in compulsory education or when in post compulsory education, particularly higher education, gradually more by the students themselves. The students are assumed to be likely to take up education as an investment if the benefits of the higher education is foreseen.

Figure 3.1

AGE PROFILES OF EARNINGS OF CHINESE MEN, 1981
(monthly earnings classified by age, for indicated schooling groups)



NOTE : Figures on curves indicate years of schooling completed.
SOURCE : K.C. Kowk (1984)

3.13 Methods in accounting for the differences in lifetime earnings and the earnings function

That people with higher education on average earn more wages (hence have higher lifetime earnings) than those who have less education has been verified in a very large numbers of empirical studies in nearly all countries. After a study of the age-earnings profiles of workers with different levels of education, Woodhall (1987) observed three general characteristics:

(a) The average earnings of all workers, both highly educated and illiterate, increase with age up to a maximum in mid-career and then the curve withers, flattens or starts to decline.

(b) The higher the level of educational attainment, the steeper the rate of increase of earnings, and, in most cases, the higher the initial earnings of workers at the start of their working life.

(c) Workers with higher levels of education reach their maximum earning capacity later than the less educated, and their level of earnings at retirement is also higher.

But, are these differences in lifetime earnings due mainly to the difference in education? Could they be caused by the differences between ability, jobs, people and the differences in social customs and/or in life chances?

Economists were aware, even in the early stage, of

the fact that not all the earnings differentials were due to schooling alone. Ability and other factors like socioeconomic background, quality of schooling, sex, race ...etc may also play a part though they also correlate with education. An alpha coefficient was thus composed which Denison (1962) suggested to be 0.6[35] is used to account for the effect of education alone for the earnings differentials.

When cost-benefit analysis was applied to education, it was corrected by the alpha coefficient as follows:

$$\text{Earning} = \alpha(Y_s - Y_{s-1})$$

When earnings data and other characteristics of individuals are available, earnings function is used to calculate the effect of different variables on earnings[36]:

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[35] Later on Denison used the cross-tabulations data on salary, education, IQ and father's socioeconomic status from the Wolfle and Smith survey and worked out the coefficient to be 0.67, very close to 0.6.

[36]. For a fuller discussion of the methodological shift when new data become available between education and work, see Psacharopoulos (1978): Education and Work: An Evaluation and Inventory of Current Research.

Earning = f (Year of Schooling, Age, IQ, Family Background..)

Since it is impossible to include all the variables in the function, only a more modest subset of variables is included. The dependent variable in the earnings function is often the labour income and the common independent variables are classified into the following groups:

Personal Characteristics

Mostly not subject to choice	Sex Age Genetic ability (if available) Family background Motivation
Mostly subject to choice	Occupation Marital status Number of children Weeks worked Human capital: Year of schooling Quality of schools Achievement On-the-job Training Migration Health

Environmental and Institutional

Geographic locality
Economic sector
Unionization
Monopoly, monopsony
Discrimination

(Adapted from Figure 1 Psacharopoulos, 1987)

Though the above division is elaborate, it is by no mean exhaustive. Moreover, the social science scene is constantly constrained by the available data, not to mention good data. For one thing there is hardly any data on early ability of individuals. To determine the effects of family background on later earnings, the measure is often confined to factors such as parents' education, occupation or income. Other data like economic situation of the family in the early years or factors like psychological characteristics of the parents, family interactions.... are either not available or difficult to construct. It is not surprising then in many of the studies in earnings differentials using earnings functions, only a small part of variance is explained.

In the event of establishing causality between earnings and the independent variables, it is common to treat these variables as if they were all exogenous determinants of earnings, i.e. to assume these variables operate independently of one another with respect to earnings (Morgenstern, 1973). In fitting the earnings function (statistically also known as the regression analysis), the contribution of each variable to earnings is thus estimated.

3.14 The quality of institutions

One independent variable to be examined here is the quality of institutions. Human Capital Theory does argue that the quality of institutions affects the earnings of the students because better school means better instruction and the transmission of better and/or extra skills would mean higher earnings for the graduates. However, many studies on the influence of schooling on lifetime earnings quoted above have been confined to the quantity of schooling. The aspect of quality of institutions has attracted less attention. This is largely due to the difficulties in defining quality aspects of a school and, for the concern of the economists, the difficulty in assigning monetary values to the quality aspects (Solmon, 1987).

In the study of quality of institutions, Psacharopoulos (1975) had identified three major groups of quality variables. These are:

a. by school expenditure (Welch, 1970), often the average per pupil expenditure;

b. by a non-expenditure assessment of schools (Carroll and Ihnen, 1967), such as the teacher's verbal ability, peer's influence, school's reputation;

c. by student quality (Johnson & Stafford, 1974), used as a proxy for the quality of institutions.

Among these, per pupil expenditure (refers to either a school or to the state where the school is situated) was used quite early as the measure for school quality and its effect on later earnings was generally confirmed (Hunt, 1963, Hirsch & Segelhorst, 1965, Morgan and Sirageldin, 1968, Solmon, 1973, Johnson & Stafford, 1973, Morgenstern, 1973). The major shortcoming of the use of per pupil expenditure was that a high expenditure did not automatically mean better quality when the efficiency factor of the school budget is not made explicit (Psacharopoulos 1975).

Another frequently used quality variable is student ability. There is some confusion in the use of quality variables and student ability. In some cases, the quality of institution is mixed up with student ability. Link (1973) had used Astin's indices of selectivity and

intellectualism[37] to measure student ability while others used them to measure institution quality. On other occasions, student ability is simply used as a proxy for institutional quality. After all 'the best, the brightest, the most highly motivated and the richest tend to cluster at the best schools' (Foster, 1979). It is therefore not surprising that several studies (Karpoff, 1968, Daniere and Mechling, 1970, Reed and Miller, 1970 and Solmon, 1973) had established that schooling quality and student ability are complementary.

There is the question of whether the quality measure be used alone or whether it should be used with ability variables in an earnings function because the inclusion of both variables would cause the problem of multicollinearity. Psacharopoulos (1975) suggested getting around the problem by having ability and quality in a recursive model so that the two variables could determine parts of the system. Since the absolute values of the explained variances of the quality variables in the earnings functions, as established in many studies are small, the bias produced by the inclusion of both

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37. This refers to Astin's (1965) use of factor analysis to gather a group of students and institution characteristics into a selectivity index and an intellectualism index.

variables would not be serious.

Solmon (1973) applied six quality variables separately to the National Bureau of Economic Research - Thorndike sample in order to compare their individual effect on earnings. These include:

faculty salary
school expenditure
school income
Astin index (use of factor analysis to summarize a host of student and institution characteristics)
SAT scores
Gourman index (rating of the academic quality of undergraduate colleges based on fellowship granting foundations and industrial opinion, staff publications, curriculum and student services)

He found that all these variables had significant impact on the earnings, but the impact was only very small (raising the Coefficient of Determination R^2 by 2.2% at the most). His later studies (1975, 1981) confirmed basically what he found in his early work. Solmon (1987) observed that the objective measures of the quality of institutions of higher education were all related to the lifetime earnings after controlling students' ability, socioeconomic background, occupational choice and motivation, although, one must add that the impact has been small.

3.15 Ability adjustment and the study by Taubman and Wales

Among the independent variables, it has been well recognized that ability alone very much affects one's schooling (Pigou, 1920, Lydall, 1979). It is believed that one's ability may have significant influence on one's earnings capability other than through education. But the determination of cognitive ability or intelligence is still a subject of debate among psychologists. It is now generally accepted that IQ has both its genetic as well as environmental influences but the proportion of the influences between the two factors vary among different schools of psychologists. Despite these differences in views, there is consensus that early environment and schooling is important for shaping later IQ (Fagerland, 1987).

In U.S. much of the literature on earnings differentials are concerned with work which adjusted the bias of schooling. Since Denison, other researchers like Griliches (1970), Hause (1971), Griliches and Manson (1972), Bowles (1972), Taubman and Wales, 1973, Morgernstern (1973), Sewell and Hause (1975) all have

dealt with the ability adjustment in some ways in the analysis of the earnings differentials of individuals.

Among them, Taubman and Wales were more controversial in that they claimed to have shown in the high school and above levels that ability is a more important determinant of income distribution than education.

Using the NBER-TH (National Bureau of Economic Research - Thorndike) sample, the follow-up work by Thorndike and Hagan (1959) which worked on data in 1955 and a subsequent work by NBER in 1969, Taubman and Wales (1973) ran a factor analysis and identified four tests of mental ability, namely spatial perception, physical co-ordination, mathematical and verbal ability. In applying these four ability factors each in turn as dummy in five levels into the regression for earnings, they found that only mathematical ability was significantly related to subsequent earnings. Table 3.1 illustrates the earnings difference in percentage of a high school graduate in the five ability levels (1 represents the lowest fifth in ability and 5 the highest fifth) with the average high school graduates.

Table 3.1
Earnings difference in % between average high school graduates and graduates of given ability level

Ability	1955	1969
1	-7.6	-10.0
2	-3.0	-3.9
3	-1.0	-0.4
4	2.4	2.9
5	9.2	15.0

Source: Taubman and Wales (1973) Table 2

In 1955, those in the top fifth ability level earned 9% more and the bottom fifth ability level about 8% less, a difference of 17%. In 1969 the corresponding figures were 15% and 10%, a difference of 25%. Over a period of time, the income of those in the top fifth had risen faster than those at the low end of the ability scale. In the comparison with the percentage increase generated by education (Table 3.2), Taubman and Wales observed that in 1955 the 17% difference between the top and bottom ability fifth was greater than the difference attributable to education, except for M. D. (Doctor of Medicine) and L. L. B. (Bachelor of Law). In 1969, the 25% difference was again greater than the difference for those people with some college education and was close to the difference at all educational levels except L.L.B. and M.D. Hence they concluded that in the high school and above levels, ability is a more important

determinant of income distribution than education.

Table 3.2
% increase in extra earnings from education for average high school graduates

Education	1955	1969
Some college	11	17
Undergraduate degree	12	31
Some graduate	15	26
M.A.	10	32
Ph.D.	02	27
M.D.	72	106
L.L.B.	19	84

Source: Taubman and Wales (1973, p33) Table 1

However, in the review of the study by Taubman and Wales (1974) on education, earnings and screening, Bowman (1976) collated some of the Taubman and Wales findings (Table 3.3) which show that omitting the Mathematics Ability and Biography (a catch-all variable which included information on hobbies, prewar family income, pre-1946 education and mathematical ability) in the earnings regression, the estimated percentage bias of education is larger for the early career (1955) data. But the bias is only around 35% (34.7% for undergraduate degree, 36.8% for Master's and 35.5% for Ph.D and L.L.B. degree), similar to Denison's estimation of the Alpha coefficient of 65%. Taubman and Wales (1974), though underlined the importance of the sample chosen, admitted

that 'the bias in the education coefficients due to omitting IQ will in general be very small'.

Table 3.3
Estimate of % bias in coefficients on education omitting maths ability and biography while all other variables were held constant

Education Level	Bias of Education 1955	1969
Some college	23.2	17.8
Undergraduate degree	34.7	19.7
Some graduate work	25.7	22.8
Master's	36.8	20.6
Ph.D and L.L.B.	35.5	11.5

Source: Adopted from Bowman Table 4 (1976)

Looking at the same issue, Psacharopoulos (1975) made a survey of 16 individual studies and discovered that:

- the alpha coefficient is not a fixed index but varies according to different levels of schooling and
- that the influence of ability plus other factors on the earnings differentials is only about 25% to 30%.

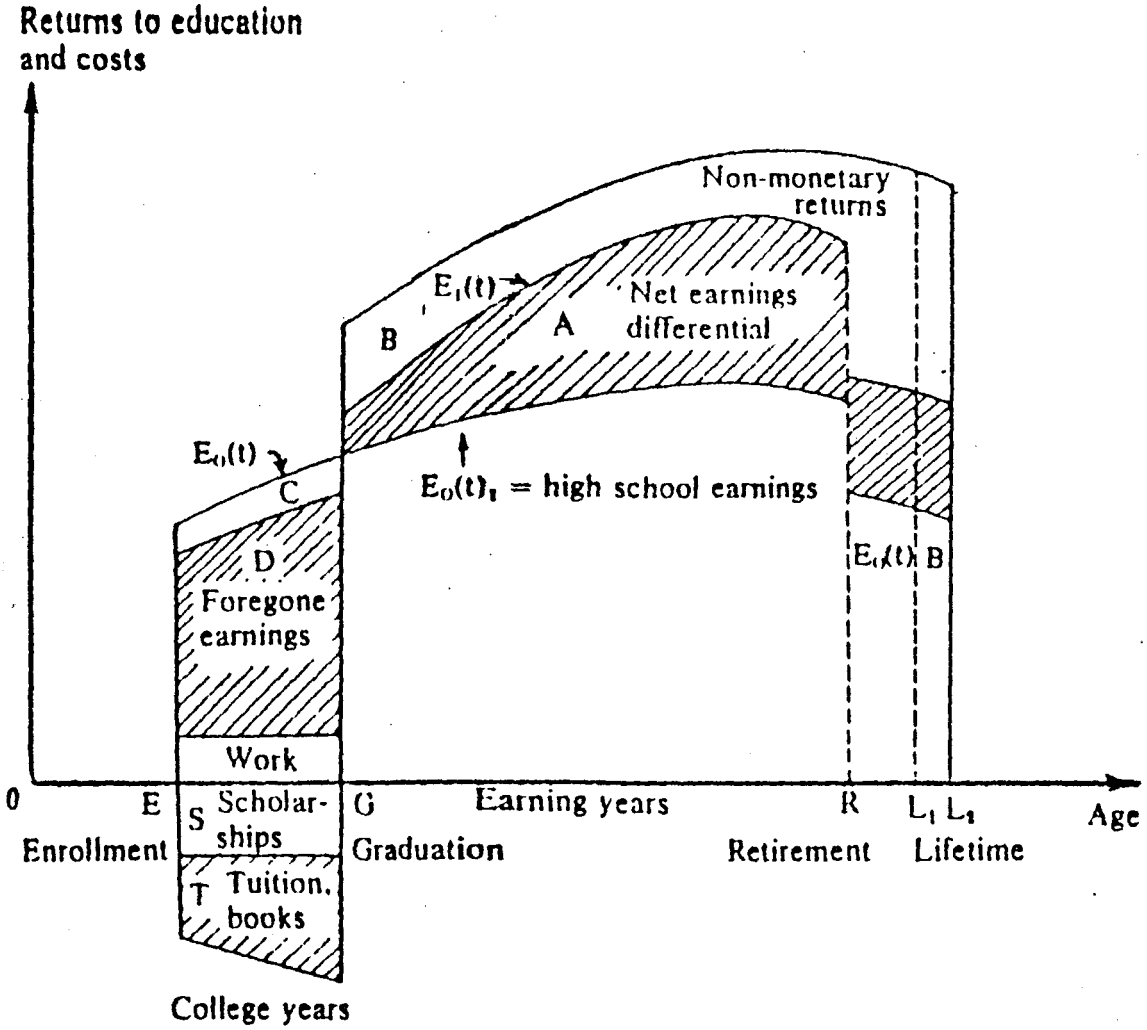
In other words, schooling has the highest influence on earnings differentials. However, the ability variable used in most of these studies quoted above still raises a problem. Few studies measured ability at an early age or during the preschool years, hence the ability

variable was affected by education and other factors. Griliches (1970) who was aware of this and reflected that much of the measured ability is the product of 'learning', argued that the estimated downward adjustments of earnings differential for ability may be overdone because of strong interaction of 'ability' and schooling. Using the Malmo sample of Sweden, a longitudinal study which measured mental ability in 1938 (at age 10) and again in 1948, and which provided the only analysis of schooling as an intervening variable between initial and later measured ability, Griliches (1970) was able to show the alpha coefficient is very large (0.96). However, the small number of observations (only 19 cases) limits its generalization.

3.16 The private and social rate of return and the calculation of expected rate of return

In the human capital educational research programme, two of the approaches have been used to evaluate hundreds of studies on the earnings effects of schooling are the private and social rates of return analysis.

Figure 3.2
Investment in higher education and private returns
over the life cycle



Source: McMahon and Wagner (1982)

At the private level, a student chooses to remain in school after compulsory education 'if the private rate of return on the next increment of education exceeds the yield of the best alternative investment option, and not otherwise' (Blaug 1972). In concrete terms, the student will have to evaluate the direct cost of tuition, books and the indirect cost of foregone earnings against the possible additional income (after tax) expressed in present value associated with a higher level of education (non-pecuniary benefits and externalities connected with education are ignored here). In many cases, education is subsidized by the government hence both the direct cost of tuition and books is minimal. It is mainly the foregone earnings which constitute the private cost of schooling of the students and is often evaluated by the earnings function.

At the social level, the question is no more testing of how the individual makes a decision about education. The issue is rather 'do social rates of return on educational investment provide relevant criteria for policy maker?' (Blaug 1972). There is the need to evaluate the social cost against the social benefit for the decision. The direct cost in the provision of education which includes teachers'

salaries, other current expenditure and imputed rent of the campus (Woodhall, 1970) and the indirect cost of the foregone earnings of the individuals have to be evaluated against the present value of the additional income (before tax) acquired with a higher level of education. Over the years, Psacharopoulos (1973, 1981, 1985) has made a series of comprehensive international comparisons of rates of return to investment in education. The findings have always been that 'the private returns are in excessive of social returns especially at university level' (Psacharopoulos and Woodhall, 1985).

As the present study is interested in students' perceived earnings in life associated with education, only the private rates of return will be studied. The social rates of return to education will be ignored.

The calculation of the rate of return to education is a straight forward business. Originated from the estimation of the rate of return of an investment project, Cost-Benefit analysis, also known as Rate of Return is borrowed to estimate the rate of return to education. There have always been a keen interest in the rate of return to education because of policy implications: a high social rate of return could justify

a greater public investment in education, while the high private rate of return could enable the policy makers to formulate strategies to meet the private (social) demand for education whether or not individuals should pay at least part of the cost themselves.

Ideally, the calculation of the rate of return should be based on longitudinal wage data. But such data are rare and take a very long time to accumulate. Instead, the cross-sectional data are used. Rate of return based on existing differentials are often referred to as *ex post* rate of return because the analysis is based on past investments. Calculation of rate of return based on individuals' expectation, which is what the present study is after, is referred to as the *ex ante* rate.

There are two basic methods for calculating the expected rates of return (McMahon, 1987). Both using a smaller number of points to approximate the expected age-earnings profiles illustrated in Fig 3.3. The two points of earnings expected at graduation (Y_0) and 25 years (Y_{25}) are used to determined the level of each age-earnings profile. Williams and Gordon (1981) used similar points (Y_0, Y_5 and Y_{25}) and assume that earnings rise linearly between these points to peak at Y_{25}, and

then level off until retirement at age 65. The expected earnings profile is used as the dependent variable in an expected earnings function.

Using students' individual data and the date on cost of education, the first method for calculating the expected rate of return, r, is simply a solution of the following standard formula iteratively on the computer (McMahon, 1987):

$$\sum_{t=E}^{G} [(C(t)+E_0(t)](1+r)^t = \sum_{t=G}^{R} [E_1(t)-E_0(t)](1+r)^{-t}$$

where $C(t)$ = direct cost of school level h
$E_0(t)$ = forgone earnings or indirect costs
$E_1(t)$ = earnings expectation of a student from graduate up to retirement
$E_1(t)-E_0(t)$ = the expected net earnings differential attributed to the next higher level of education
G = graduation
R = Retirement
E = Enrolment
r = internal rate of return
t = age

Psacharopoulos (1980) and Psacharopoulos and Sanyal (1981a, 1982) have suggested and used the 'short-cut method' which focuses on the net earnings differential at graduation as follows:

$$r = \frac{E_1 - E_0(G)}{\sum_{t=0}^{5} [C(t) + E_0(t)]}$$

The main advantage of this method lies in its ease of calculation for approximate comparisons. But because the method does not take into account the growth of earnings after graduation, it tends to underestimate net rates of return - a fact well recognized by the authors.

The second method in use for calculating expected rates of return to estimate the rate of return is to fit a general earnings function of the following form[38]:

$$\text{Ln } Y = \beta_1 + \beta_2 S + \beta_3 t + \beta_4 t^2 + u \qquad (1)$$

Where Ln Y = log of annual expected earnings; s = number of years of schooling; t = number of years of experience on the job; and u = disturbances. The partial differential of Ln Y with respect to S is then the expected rate of return:

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[38]. The earnings function was originally developed by Mincer (1974) in the following basic form (the schooling model):

$$\text{Ln } Y = a + bS$$

$$r = \frac{\delta \text{Ln } Y}{\delta S}$$

The expected rate of return is nothing else than the relative change in earning δLn Y following a given change in schooling δS if δS is proportional to costs of schooling.

A general earnings function which measures schooling differently[39] and which includes the influence of other factors was used by Williams and Gordon (1981):

$$\text{Ln } Y = a + \beta_1 E_1 + \beta_2 E_2 + \beta_3 A + \beta_4 SX + \beta_5 FB + \ldots \quad (2)$$

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[39]. Drawing on British education experience, Psacharopoulos and Layard (1979) argued that an analysis based entirely on years of schooling (s) as in the US fails to reflect the true picture. Instead of years of schooling they preferred qualifications as the independent variable. An earnings function is suggested in the following form (Psacharopoulos, 1980):

$$\text{LogY} = a + b\text{PRIM} + c\text{SEC} + d\text{HIGH} + e\text{EX} + f\text{EX}^2$$

Where PRIMary, SECondary and HIGH school are a series of qualifications of dummy variables having a value of 1 if the individual belongs to the particular education level and 0 if not.

Where Ln Y = log of lifetime expected earnings; E_1 = level of schooling (e.g. secondary education); E_2 = different level of schooling (e.g. higher education); A = ability scores; SX = sex; FB = family background. The calculation of the expected rate of return is to discount the estimated lifetime earnings by a discount rate 'r'. Empirically it is to find an 'r' which would reduce the coefficient of the $ß_1$ and $ß_2$ to 0. This is to reduce the effect of entering a higher level of education on discounted expected lifetime earnings to zero. The rate of discount is thus interpreted as the perceived internal rate of return. This is the method to be adopted by the present study. A more detailed explanation could be found in Chapter 4 (4.12).

3.17 Summary

The introduction of Human Capital Theory intends to establish the theoretical grounds particularly the parts related to the arguments to be used by the present study. The theory of production augmenting views and the schooling as a general training are briefly mentioned. The section concentrates more on the application which includes earnings function and the variables in the function. The independent variables of quality of

institutions and ability are given some length in the discussion. This is due to the recognized importance of ability in affecting one' lifetime earnings and the importance of quality of institutions in affecting the careers of students in Hong Kong as well as their lifetime earnings. The last part of this section touches on the private and social rates of return and the calculation of the expected rates of return to education.

3.2 The Theory of Screening/Signalling

The study of students' information and decision to invest in education is also the interest domain of the Screening/Signalling Hypothesis.

The Screening/Signalling Hypothesis contests the interpretation that people with higher education always have higher average earnings and that it is due to the screening effect of schooling. Acting as a filter, schooling identifies the pre-existing characteristics of individuals. In an imperfect labour market an employer has inadequate knowledge of the marginal productivity of the new entrant. In order to avoid mistakes and the cost of finding out who the more productive ones are, he uses

certificates as the proxy for the required qualities. When college graduates are in greater supply, he simply upgrades the hiring standards (qualification inflation). The social value of education is reduced to a signalling device which helps to place the right person in the right job. Presented in this way, there is the likelihood that more education may be consumed than is socially efficient with the result that the private returns to education exceeds the real social return.

Bowman (1976) identified three main variants of the theory of screening:

a) Labour markets are open and there is effective wage competition. However, information is costly. Hence rational employers use schooling of an individual as a clue, in order to make better guesses as to which individual will be the most productive --including which will be better investment for employer-paid training (formal or informal).

b) As in (a), employers are rational, but there is little wage competition; instead there is queuing for jobs, and one's rank in the queue is determined by his schooling and

c) Human resources are allocated in the interests of a managerial elite (sometimes 'capitalists'), and schooling is used to sort people out for entry into segmentalized labour markets.

The present paper will mainly present the arguments of variant (a) of the screening theory - basically the

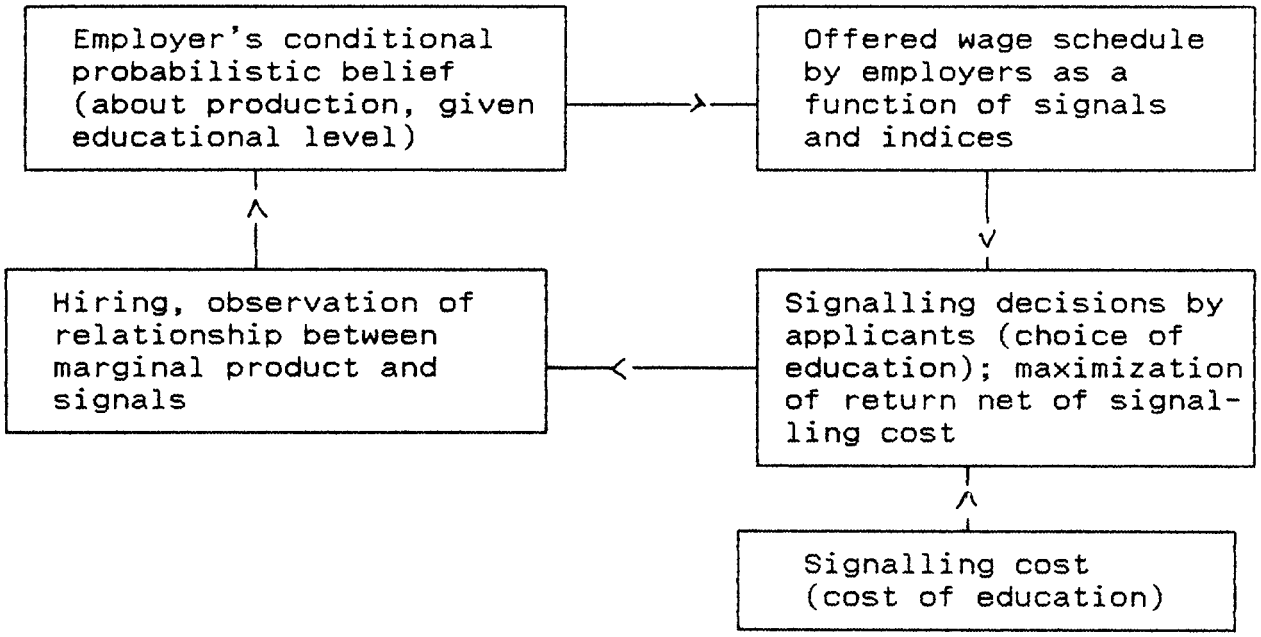
position of the neo-classical school of economics. The theoretical work in this aspect is confined to the economics of information and on the functioning of labour markets under uncertainty.

The Screening/Signalling hypothesis is originated from the concern of how information about an individual's productivity is transmitted to potential buyers. There are two sides of the picture: the students who invest in more and more education to signal to their potential employers their high abilities (signalling) and the employers who rely on qualifications to screen the potential workers (screening). It is the signalling part of the hypothesis that the present study is interested. However it must be recognized that though with different emphasis, basically Screening/Signalling is one theory and the arguments developed below will inevitably tough on both sides of the hypothesis. Likewise, although 'Signalling Hypothesis' will be adopted in the following presentation, it often refers to Screening/Signalling Hypothesis.

3.21 Conditional probabilistic beliefs

The accumulation of educational credentials by students as a method of signalling their talents to firms was emphasized by Spence (1974). Spence (1973) observed that in most job markets the employer was not sure of the productive capabilities of an individual at the time he hired him. What the employer encountered was the personal data in the form of unalterable attributes such as race, sex, age which Spence referred to as *indices* and observable characteristics such as education services record which he referred to as *signals* which were subjected to manipulation by the individual. It is sometime after hiring that the employer will learn the individual's productive capabilities. On the basis of previous experience in the market, the employer will have conditional probability assessments over productive capability given various combinations of signals and indices. This is illustrated in the diagram of Figure 3.4.

Figure 3.4
Informational feedback in the job market



Source: Adopted from Michael Spence's Market Signalling : The Informational Structure of Job Markets and Related Phenomena, Figure 3.2

The wages offered to new applicants is dependent on the employers' conditional probabilistic beliefs. Such beliefs are based on productivity of the last batch of applicants. After hiring, the applicants' true productivity is discovered and the beliefs of employers are modified and wages offered are then adjusted. Figure 3.4 illustrates this cycle of informational feedback in the market. Over a period of time, an equilibrium between the employers beliefs that generate the offered wages upon hiring and the applicant's signalling level

of education is reached. The employers' beliefs become self-confirming.

3.22 Signalling costs and productivity - the negative correlation

For the individuals, Spence (1973) assumed that signalling costs, which broadly include psychic, time, monetary and others, were negatively correlated with productivity and that the individual's perceived wage was offered to the levels of education which he/she intended to pursue.

In explaining Figure 3.4 in a numerical form, Spence (1973) considered a case where there were two groups of workers, the group I worker with productivity of 1 and the group II worker with productivity of 2 (consider 1 and 2 as marginal product). Group I was a proportion of q_1 of the population; group II is a proportion of $1 - q_1$. There was a potential signal of education which was available at a cost. The cost of education was both monetary and psychic. Assuming that the cost to group I of y units of education was y and to group II was y/2. Supposing that the employer believed that there was some level of education say y* such that

if $y < y^*$ then productivity is one and probability one

if $y \geq y^*$ the productivity is two and probability one

If these were his conditional belief, then his offered schedule would be W(y).

Given the offered wage schedule, members of each group would select optimal levels for education. Consider those who would set $y < y^*$. If he did so, he would set $y = 0$ because education was costly and there was no benefit to increase y until he reached y^*. Likewise, those who set $y \geq y^*$ would in fact set $y = y^*$ since further education would merely increase costs with no corresponding benefit. Given that each group would select y to maximize the difference between the wages offered and the cost of signalling - which was the cost of education, group I would choose

$y = 0$ if

$1 > 2 - y^*$ (wage offered for group I bigger than the difference between wage for group II and educational cost)

and group II

$y = y^*$ if

$2 - y^*/2 > 1$[40] (net income - difference between wage offered for group II and educational cost, bigger than wage for group I)

Putting the two conditions together, it is easy to establish that the employer's initial beliefs were confirmed by market experience provided that y^* satisfied the following inequality:

$$2 > y^* > 1$$

and a signalling equilibrium was achieved.

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[40]. In explaining the aspect of Signalling/ Screening theory, Stiglitz (1975, p285, footnote 2) commented that the Spence's specification of equilibrium conditions was incomplete. Instead his specification was:

Considered a case where there were two groups of workers, the group I workers with productivity of O_1 and the group II workers with productivity of O_2, where $O_1 > O_2$. Both groups knew their ability but the market did not. Assuming there was a signalling process which cost c for every individual providing the signal (education cost) and where

$O_1 - O_2 > c > O_1 - O$ .....(1)

$O = O_1(hO_1) + O_2[1-h(O_1)]$.....(2)

O_1 = marginal product of high-productive workers
O_2 = marginal product of low-productive workers
O = mean marginal productivity of all workers in the work force
c = cost for signalling (educational cost)
h = proportion of population of O_1
1-h = proportion of population of O_2

With conditions (1) and (2), Stiglitz believed the specification of equilibrium was complete.

3.23 Two possible equilibrium and their implications

It is easy to see that within the employer's expectations, there is an infinite number of possible equilibrium values of y*. Two of the important equilibriums are defined as follows :

(a) The no-signalling[41] equilibrium

This refers to the situation that when no signalling took place and no difference was made between the two groups of workers. When this happened, they all received the same income which was equal to the mean productivity of the population $2 - q_1$, derived from the following:

$$q_1 + 2(1 - q_1) = 2 - q_1$$

Group I is definitely better off in no signalling situation because $1 < 2 - q_1$. Group II may also be better off. Assuming that the proportion of people in group I was 0.5, since $y^* > 1$, the net return to group II, $2 - y^*/2$ must be below 1.5, the no-signalling wage.

(b) The full-signalling equilibrium

The group II workers received a net income of $2 - y^*/2$; group I workers an income of 1. Since group I workers knew that they were less able, they did not pay for any screening. Only

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[41] Stiglitz (1975, p284-85) used the term 'no-screening' while Spence (1973, p363-64) used 'no-signalling'. When education is looked at in the capacity of a signal which provides information about individuals, 'signalling' is preferred here.

group II worker paid for screening. If not they would be 'lumped' together with group I workers and receive the same wage as 1 which was less than 2 - y*/2.

Stiglitz (1975) further generated several implications concerning signalling:

(1) In the full-signalling equilibrium, both groups have lower net incomes than in the no-signalling equilibrium:

group I received 1 and

group II received 2 - Y*/2 which were both less than 2 - q_1

(2) the presence of the less able workers lowered the net income of the more able worker:

In the absence of group I, group II would receive 2;

in the full-signalling equilibrium group II would receive 2 - y*/2;

in the no-signalling equilibrium, they received 2 - q_1.

Conversely, the presence of the more able may increase the income of the less able;

(3) when one of the functions of education was to screen individuals, social returns differed from private returns and was equal to 0 because the only effects of screening were distributional. Private rate of return was positive at least for the able workers.

The above arguments illustrate the nature of private returns to signalling where the more able were better than the less able. This inequality causing

signalling is *hierarchical*. Stiglitz (1975) argued that the individuals who were able to capture the returns to general information about their skills were willing to spend resources to provide this information. But if the information was relatively costless, then everyone except the least able individual would have an economic interest in providing such information. If there was the absence of any correlation between educational costs and productivity, argued Spence (1973), education would cease to be an effective signal.

3.24 The able students and the accumulation of education

Presented in this way, it is obvious that signalling means a gain to the high-productive workers and it would be in the economic interest of the high-productive workers to provide information about their own capabilities if they were aware of them even if they have to bear the cost of signalling.

Following the similar arguments by Spence, Stiglitz and others, Riley (1976, 1979) further advanced the theory of Signalling and tried to incorporate it in the traditional framework of Human Capital theory.

Starting with the Stiglitz's position that employers were unlikely to incur large expenditures for on-the-job evaluation of their employees' potentials, Riley (1976) asked whether employers could make job offers based entirely upon educational credentials. The key element lay in whether marginal costs of education might vary between individuals. If the marginal cost of an additional unit of education was highly negatively correlated with productivity on the job, it would be the more skilled individuals who accumulate more education (Spence's basic assumption). If this was true, then although productivity was not directly observed until later in the career, educational achievement might 'signal' information about this productivity to potential employers.

3.25 Education - productivity enhancement and mechanism for sorting

Riley (1979) criticized the early Signalling theorists for spending too much time in discussing difficulties in defining an 'information equilibrium'. The position of the screenist, according to Riley (1976), is that education both enhances the individuals' productivity levels and provides a mechanism for sorting

out differences in these levels.

This is clearly divergent from the early screenists like Arrow (1973), and brings Riley close to the views of Williams (1978), who simply believes that the use of educational credentials is socially justifiable and Blaug (1983), who believes that the second generation of economists of education would endorse some version of the 'screening hypothesis'.

Another of Riley's (1976, 1979a, 1979b) innovation to Signalling Hypothesis is his link up of the recent theoretical modelling of information transmission via self selection with the traditional human capital literature. Applying Mincerian log-earnings function of schooling to the cross-section data from the Current Population Survey, Riley (1979) revised basically the 'high and low paying occupations' model developed by Taubman and Wales (1973) and tried to establish that educational screening would be used more extensively in some occupations (the screened sector) where direct observation of an individual's productivity and evaluation of his potential is much more difficult than in other occupations (the unscreened sector).

3.26 Summary

In this section, the Signalling Theory developed by Spence is introduced. Signalling is basically concerned with how information about a student's productivity is conveyed to the potential employers. This is affected by the employers' conditional probabilistic beliefs illustrated in the informational feedback loop. Signalling creates inequality. The theory assumes that productivity is negatively correlated with signalling cost and that students are in general aware of their ability. It is therefore in the interests of the able students more than the less able students to accumulate more and more education to indicate their capability to the future buyers - a point to be pursued in the present study. Lastly, the views by Riley, a recent contributor to Signalling Theory who considers education both enhances productivity and provides mechanism for sorting is briefly introduced.

3.3 Studies on *ex ante* Rates of Return and The Work by Williams and Gordon

As the present thesis will study the *ex ante* rates of return to higher education, three related studies on *ex ante* rates of return are cited here for examination and comparison. These are the studies by Williams and Gordon (1981), Bosworth and Ford (1985) - both are related to UK experience and the works by Psacharopoulos and Sanyal (1981) which draw on experiences from third world countries.

In 1976, after critically reviewed the studies on the demand function for formal schooling in the US, Blaug (1976) lamented that what was in absence was a dynamic theory of the formation of expectations and that 'the issue in the theory of human capital is precisely whether students take any forward view of economic variables.'

Williams and Gordon (1981, p200) made a similar observation which also manifests the aim of their study:

> 'An essential step in any model which links private rates of return with the demand for post-compulsory education is that students and potentials students are aware of these returns and act upon them. A high rate of return will not influence student decision-making if this return is not perceived. Similarly, individual students may believe that

> high returns can be achieved through continued education but consider that their lack of ability or their disadvantaged family background make it unlikely that they will be able to take personal advantage of these high returns, others may simply have a fatalistic view of how life's rewards are shared out.'

They expressed surprise that there had been very few studies of the perceived (*ex ante*) returns to continued education and no economic analyses of earnings functions as perceived by students who were taking decisions about whether or not to stay on in full-time education. They were among the first to test the assumptions of students' economic motive for higher learning and calculate the *ex ante* perceived rates of return to upper secondary and higher education in Britain. Their study offers a direct empirical test of one of the main tenets of Human Capital Theory. Their work is briefly examined here for better understanding.

Concerned with the stagnation of the demand for post-compulsory education in early 1970, Williams and Gordon conducted a research in 1977 on 2977 students who were in their final year of compulsory education. The purpose of the survey is to inject economic factors which were neglected by official educational planners during the unprecedented expansion of post-compulsory education in the 1960s in the analysis. In the survey,

each student was asked to complete a questionnaire containing information on his family background, educational performance to date, educational and career intentions. Students who intended to go on for higher studies and the highest qualification they expected to obtain were separated from those who intended to work after they finished compulsory education. Earnings expectations of the students at the start of their working life, at age 26 and 46 and the perceptions of the financial and other characteristics of a variety of occupations were reported. A crude expected age-earnings profile for each individual could then be constructed. In order to ascertain the students' ability and to deepen the scope of the study, a short standardised verbal reasoning test was constructed and the students were asked to attempt the test.

The fact that higher earnings could not be attributed to education alone was recognized from the start in the study and earnings function was employed to calculate these different contributions. Before this, the writers compare the median perceptions of earnings by age for boys and girls with the actually observed age-earnings profiles. The crude comparison suggests that overall, young people of England and Wales did have a fairly accurate perception of the earnings prospects

associated with the different educational paths they might follow.

In the earnings function, the expected lifetime earnings were computed and treated as dependent variable. The independent variables includes:

Educational intention
Verbal reasoning test score
Sex
Family background
General perceptions of earnings
Subjective estimate of intellectual ability
Attitude towards risky jobs
Attitude towards deferment of gratification

Regression analyses were applied with the whole sample; with boys and girls; with social class and ability interactions. As a whole the findings of the study show that the human capital model offers a more satisfactory explanation of the behaviour for the high ability and middle class students than it does of low ability and working class students. The perceived private rates of return to education which are estimated to be 10.1% and 7.7% for boys and girls respectively for higher education and 16.8% and 9.1% for boys and girls respectively for upper secondary education correspond closely to the actual rates estimated by other earlier

studies[42]. The articles also provided useful support for differences between social classes and ability groups.

A path analysis based on the Blau (1973) model is applied to understand how the variables of ability and social class are mediated through intended education on the perceived lifetime earnings.

3.31 The study by Bosworth and Ford

The study by Bosworth and Ford (1985), 'Income Expectations and the Decision to Enter Higher Education' is part of the results of a survey made to 261 undergraduates, of which 30% are female and 70% are male, of Loughborough University of Technology in September 1982. The main objective is to find out 'why

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[42]. An example of this kind of study is a finding in 'How Much is a Degree Worth?' by Clark A and Tarsh, J of Department of Education & Science which appeared in Education & Training UK, 1987, p109-115. For a degree course (all subjects) the average private rate of return from 1979-1984 for men excluding maintenance award was 16%. When maintenance award is included it was 24%. Both figures were well above the estimated social rate of return which was around 8 or 7% (depending on whether research was excluded as cost or not in the calculation).

candidates enter higher education and how they select a course and place of study, and in particular to understand more fully those factors that were important in the selection of courses at Loughborough.' (Bosworth and Ford, 1983, p.1).

In the survey, there are aspects on careers which ask the students to indicate the reasons for their choice of a career and the perceived lifetime earnings associated with degree holding and A level qualification. Attempts are applied to determine the relative significance of a range of social and economic factors that influence the choice of subject area.

As acknowledged by the authors, the findings of the study are affected by the unrepresentative proportion of students who hold relatively high income expectations (Bosworth and Ford, 1985). It is therefore not surprising that the perceived expected lifetime earnings is more than two times and the private *ex ante* rates of return to higher education is over two times higher than that of the Williams and Gordon sample.

One of the interesting discoveries is that the undergraduates indicated that financial returns was less influential than the concern with personal and

intellectual satisfaction and development in their wish for the pursuing of Higher Education (Bosworth and Ford, 1985, Table 6)[43]. It is possible that once admitted into the university, the immediate concern of these successful students was more on the various disciplines they had chosen to pursue in the coming years than financial consideration. However, financial consideration was still in the mind of the students. Table 8 of the same study (Bosworth and Ford, 1985, Table 8) where students were asked to state the influences on the decision for a particular course, the reason 'Central to Career' enjoyed the highest rating.

From both aspects of sample size and generalization the study by Bosworth and Ford is of a minor importance. The effort of Bosworth and Ford lies not so much in the findings but the discussion of the methodology used in the collection of the perceived income data. In their study, they raised a different method in the collection of the perceived income data. The different methods used

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[43]. This is contrary to the finding of, for example, the Philippines study where 81% and 86% of the 9105 students considered respectively 'to obtain a specific professional qualification' and 'better employment opportunities with a college education' to be extra-important determinants in deciding whether to pursue higher education.

by Bosworth and Ford and Williams and Gordon will be discussed in the next chapter which is devoted to the discussion of methodology.

3.32 The study by Psacharopoulos and Sanyal

There are a number of related studies on graduate employment and higher education by Psacharopoulos and Sanyal. These studies originate from the ambitious project of IIEP entitled 'Graduate Employment and Admissions Policy in Higher Education' which 'was designed to explore in several countries the relationship between the employment of graduates and the policies of admission into institutions of higher education.' (Sanyal & others, 1976). The project grouped under the work of 'Higher Education and Employment: The IIEP Experience in Five Less Developed countries' (the five countries were Sudan, Zambia, Tanzania, Philippines, Egypt) and adopted a similar method of enquiry in the approach[44]. Mainly for this reason,

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[44]. This involves the use of 3 different questionnaires to collect data from the university (college) students, the graduates and the employers.

instead of looking at five countries, only one study - the 'Student Expectations and Labour Market Performance: The Case of Philippines' (Psacharopoulos and Sanyal, 1981a) is chosen here for closer examination.

The study by Psacharopoulos and Sanyal on Philippines is based on the report 'Higher Education and The Labour Market in The Philippines' by Sanyal, Perfecto and Arcelo published in 1981. Though the work covers a wide aspect of graduate employment in the Philippines, in the study, attempts were made to estimate the *ex ante* rates of return of the university students.

In the study, a total of 9105 college students who were in their third or fourth year and 4655 graduates roughly equally divided between the two sexes were included in the survey. Under the heading 'perceived expected earnings', the students were asked to put down their expected gross monthly earnings at the start of their careers, five and ten years thereafter. The initial expected earnings of the students corresponded closely to the actual earnings of the graduates in the age group of 25 - 29, while the expected growth of earnings were higher than that of the graduates. In the *ex ante* assessment of the opportunity cost of higher

education, the estimate of the students was found extremely realistic.

As the students were only asked to estimate their expected monthly earnings at 3 careers points early in life (at 0, 5 and 10 years after graduation), no individual lifetime earnings were constructed. In the regression analysis, the following were employed as dependent variables:

- self-assessed foregone earnings,
- working students' earnings,
- expected earnings at the start of the careers,
- expected earnings after 5 years,
- earning growth,
- expected waiting time to get a job and
- the National Entrance Examination scores.

The independent variables include the following groups of factors:

- personal variables
  age, sex, civil status
- social-economic status variables
  father's occupation and gross salary
- region
- educational variables
  type of school, field of specialization
- careers expectation variables
- ethnic variables
- a set of dummy variables

(Psacharopoulos and Sanyal, 1981a, Table XVII)

The data set was rich in information, but the very low value of the R^2 (coefficient of determination) in the

students files of some of the regression equations (eg 0.004 for waiting time) must be disappointing (Psacharopoulos and Sanyal, 1981a, Table XVIII and Table XIX). In a similar study by the same authors 'Student Expectations and Graduate Market: Performance in Egypt' which used a similar method, the findings of R^2 in the regression analysis of the expected earnings are higher but still on the low side (Psacharopoulos and Sanyal, 1982, Table IV & Table A VII). The large number of dependent and independent variables and the low explainable variance made interpretation of the data rather difficult.

In the study, the *ex ante* rates of return (private) of students to college education are calculated using the formula[45]:

$$r = \frac{Y_o - Y_{for}}{5(Y_{for} + C)}$$

where 5 = an assumed across the broad length of

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[45] In the later study by Psacharopoulos and Sanyal, 1982 on 'Student Expectations and Graduate Market: Performance in Egypt', a slightly modified formula was used as follows:

$$r = \frac{Y_o - Y_{for}}{5Y_{for}}$$

college studies in years
C = direct private monthly cost of college education
r = rate of return
Y_o = the starting salary
Y_{for} = the self-assessed foregone earnings

As only the initial earnings are used in the calculation of the expected rates of return, the estimated rate of return at 5.2% (at 7.3% when the cost of college education approximated at 200 pesos per month was excluded) could be underestimated.

Some findings common to the 5 developing countries, 'Higher Education and Employment: The IIEP Experience in Five Less Developed countries' and the study by Williams and Gordon are worthy of mentioning here. The first is the feature of the advantages the male has over the female. Male college students in general expected a higher earnings than the female irrespective of courses attended. It is shown as follows:

Countries	Expected female-to-male initial earnings ratio
Philippine	0.68 (Psacharopoulos and Sanyal, 1981a)
Egypt	0.76 (Psacharopoulos and Sanyal, 1982)
Tanzanian	0.70 (Sanyal & Kinunda, 1977)
Zambia	0.86 (Sanyal el at, 1976)
UK	0.66 (Williams and Gordon, 1981)

Secondly the students in these countries were all found to be realistic in their estimation of the expected

earnings as compared with those of the graduates earning profiles. Thirdly, the majority of the students indicated vocational intention in their pursuit of higher education.

3.4 Summary

This chapter captures the main arguments of Human Capital and Screening/Signalling theories for the theoretical base of the thesis. It also introduces three pieces of *ex ante* rates of return studies as reference points. It shows that other than education, the lifetime earnings of the individual is also affected by the individual's ability and quality of schools, but the estimated effect, as compared with education is small. It introduced the various ways in the calculation of the expected rate of return to education.

On the part of Signalling Hypothesis, Spence's model which emphasizes on the individual's effort to acquire more education as a signal to the potential employers their high ability is briefly explained. This is based on the critical assumption that the cost of acquiring education is negatively correlated with one's productivity.

The last part of the chapter describes several studies on *ex ante* rates of return to higher education which produce fairly similar results.

CHAPTER 4 RESEARCH METHODOLOGY

4.0 Introduction

This chapter is divided into three sections. The first part states briefly the arguments of the Human Capital and Signalling Screening theories which form the basis of the theoretical arguments of the present study. It introduces the methods used in the study by Williams and Gordon. It compares and scrutinizes the two different ways perceived lifetime earnings data are collected as respectively presented by Williams and Gordon and by Bosworth and Ford. It then describes the ways the expected lifetime earnings and the perceived private rates of return are estimated in the Williams and Gordon study.

The second part of the chapter concerns the four areas of interests of the present study. Statistical methods including Pearson Chi-square, Log-linear and Multiple Regression are called for the analysis. In the Multiple Regression analysis, both the dependent and independent variables are defined.

The last part describes how the data of the present

study are collected.

4.1 The Theories

The present paper uses Human Capital Theory as part of the basis of the theoretical framework. One of the basic assumptions of Human Capital Theory in education is that students are prepared to sacrifice immediate gains if they foresee that the economic benefits after higher education is more lucrative.

Williams and Gordon (1981) observed that in order to show that the high private rates of return to education constitutes the demand for voluntary education, it is necessary to establish that students are aware of these high rates of return and act on them. The factors which hindered the further advancements in education such as the lack of ability or the disadvantaged home background or the poor quality of institutions should also be examined.

On the other hand, the Signalling theory which forms another part of the theoretical basis of the present study argues that the demand for higher education - the acquiring of the educational signal is a

result of the employers' hiring requirements which are based on educational credentials. These hiring requirements have created an incentive for the students to produce the educational signals so as to maximize their probability of being employed. The theory assumes that the signalling costs which broadly include psychic, time, monetary are low for the high ability students and are negatively correlated with productivity. The students are aware of their ability and it is in the interest of the high ability students to invest more and more in higher education.

The present study will involve the Human Capital and the Signalling theories to study the demand of the Form V students for higher education in Hong Kong. From the view point of the students, it is immaterial for them whether schooling is a screen or productivity augmenter (Lazear, 1977) and it is on the demand side of education where the Signalling Hypothesis complements the private rate of return to education of Human Capital Theory (Blaug, 1976).

4.11 The methods used by Williams and Gordon and the ways the data of perceived lifetime earnings are collected

On the part of students' perception of economic benefits associated with education, the present research is modelled on the frame work of the study by Williams and Gordon (1981), hence the methods used in their studies are examined here in greater detail.

In early 1977, Williams and Gordon conducted a questionnaire survey to collect information of 2944 students who were in their final year of compulsory education. The questionnaire was designed to gather four kinds of information. These include:

a) students' personal data, careers intentions and self assessment;

b) students' perceptions of the financial characteristics of and their preference for and attitudes towards a number of occupations;

c) students' socioeconomic background and the parental influence on their careers intentions and

d) an verbal reasoning test specifically designed to investigate students' abilities in language (English) and Mathematics.

The design of the questionnaire enables a survey of the students' professed reasons for higher learning; a calculation of the expected lifetime earnings according

to different careers intentions. From this, the comparisons of earnings functions of students with different careers intentions and abilities as well as the estimation of the perceived *ex ante* private rate of return to education were made. The information of family background also allows the study of the influence of the socioeconomic factors.

One of the crucial issues in the study of *ex ante* rates of return to higher education is to accurately collect the perceived lifetime earnings data. Bosworth and Ford (1985) even attributed this to the reasons why so few studies have been devoted to *ex ante* rate of return analysis.

Thus far, as revealed in the UK studies, there are basically two methods in collecting the perceived lifetime earnings. One method is represented by Williams and Gordon (1981)[46] and the other one by Bosworth and Ford (1985).

McMahon (1987) argued that economists have generally assumed that income expectations are formed by

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[46]. The methods used by Psacharopoulos and Sanyal in their studies which measured 3 careers points (at 0, 5 and 10 years after graduation) are similar to those of Williams and Gordon.

an adaptive process. Students who have no full-time earnings experience normally observe what has happened in their family, to friends in or outside schools, recent graduates and teachers. Schultz (1967) has suggested that students can only realistically estimate two points on their earnings profile in income expectation, their starting salary and their earnings at the age of about 45 - the age of their parents.

In the research by Williams and Gordon (1981), this approach was adapted. Students who indicated in the questionnaire their different routes of careers were asked to estimate the expected earnings per week at 3 separate times in their lives: when they first started working, when they were at 26 and again at 46. In the estimation, students were requested to ignore the factor of inflation in their estimation.

In the study 'Income Expectations and the Decision to Enter Higher Education' by Bosworth and Ford (1985), the students who were first year undergraduates of Loughborough University were asked to estimate at the time when they answered the questionnaire the various age income streams for individuals with 'A' level and degree qualifications. The following table with explanation to assist students in their estimation was

used in the Bosworth and Ford study,:

> As a degree holder in the subject you have chosen, estimate what you think you might be earning at this point in time at the following ages. If you have little idea, please make the best guess you can.

Age	Gross Income £ (000)
on graduation	2 3 4 5 6 7 8 9 10 12.5 15 17.5 20 25 30 40 50+
25	2 3 4 5 6 7 8 9 10 12.5 15 17.5 20 25 30 40 50+
35	2 3 4 5 6 7 8 9 10 12.5 15 17.5 20 25 30 40 50+
45	2 3 4 5 6 7 8 9 10 12.5 15 17.5 20 25 30 40 50+
55	2 3 4 5 6 7 8 9 10 12.5 15 17.5 20 25 30 40 50+
60/65	2 3 4 5 6 7 8 9 10 12.5 15 17.5 20 25 30 40 50+

An interesting phenomenon was observed. It is found that in the Loughborough University (hereafter LU) sample the income streams are more than two times higher than the highest two groups in the Williams and Gordon sample. This is also true in the perceived *ex ante* rates of return (Bosworth and Ford, 1985, Table IV). Bosworth and Ford believed that this was mainly due to:

i) Inflation (Williams and Gordon's research was done in 1977 while the LU sample was in late 1982);

ii) Difference in samples. The Williams and Gordon sample was from a general school population but the LU sample was an unrepresentative sample drawn from students who have already entered university and hold high income expectations and

iii) the fact that in the Williams and Gordon sample, the perceived income of respondents did not increase after the age of 46 while in the LU sample the expected income streams for both the graduate and non-graduate continued

to grow until retirement.

Bosworth and Ford (1985) then questioned the ways the data of perceived lifetime earnings should be collected. Which is more accurate, Bosworth and Ford inquired:

> ' To ask the individual to assess the amounts that he/she would expect to earn <u>at various points in the future</u>[47] if the individual had either chosen not to enter higher education or entered the university as planned.' or
>
> ' to ask the individual what he/she might expect to earn <u>at this point in time at various ages</u> if the individual had either chosen not to enter higher education or entered the university as planned.' (Bosworth & Ford, 1985 p30-31)

It is inevitable that because of factors (i) and (ii) listed above, the perceived income streams of Williams and Gordon are lower than those of Bosworth and Ford[48]. What is left to decide is factor (iii).

The answer to factor (iii) could be very straight-forward. Since the students in the Bosworth and Ford sample were requested to make self estimates their

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47. Underlined by the present writer.

48. The late 70s and early 80s was a period in UK which experienced a very high inflation. It was highly possible that inflation alone would account for a difference of 100% between the two samples.

earnings as degree holders or with A level qualification at various ages, subjectively there is no reason why students would not want their earnings to rise continuously. It is possible that the students of Loughborough University had this in mind and responded accordingly. This may explain why the expected earnings of the Bosworth and Ford sample continue to rise after 45 up to retirement.

Theoretical argument aside, a simple way to see how different the two methods are in the self estimation of earnings is to compare the actual earnings streams produced by the two methods[49].

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[49]. It is perhaps necessary to point out here a contradiction in the Bosworth and Ford method. In the estimation of the perceived lifetime data, Bosworth and Ford were particularly concerned with the timing of how students assessed income streams at various ages. They asked the students to assess the amounts the students themselves might expect to earn '*at this point in time*' at various ages. However, there is an embedded paradox in the question.

The students were asked to think of '*this point in time*' but in fact they were asked to look into their earnings at various ages, it is inevitable that students who were asked this question would think <u>in terms of their future time frame</u>. If this is the case then it is no different from asking the students to estimate their future earnings. If, however, the question is directed to the students 'estimation' of other degree holders at 'this point in time', their understanding of the question would be entirely different. They would then be thinking of the earnings of a doctor's, or a teacher's at the age of 50 or

In the Bosworth and Ford survey, students were asked to report their expected income at an interval of 10 years until retirement age (for boys it was set at 65 and girls at 60). The findings show that both the non-graduate and graduate income streams continue to rise until retirement. The following table taken from Bosworth and Ford on male graduate and non-graduate incomes illustrates this (Bosworth and Ford, Table 1, p25). The last entry, the total lifetime income at age 65 is included for comparison:

	MALE	
Age	Graduate Income	Non-graduate Income
	£	£
18	1,500	3,721
20	4,667	4,360
30	9,862	6,903
40	12,943	8,606
50	15,540	9,895
60	17,451	10,644
65	18,298	10,862
Total lifetime Income (18-65)	607,790	405,056

If the Williams and Gordon formula:

$$ELE = 0.5(26 - A)(E_1 + E_2) + 10(E_2) + 29(E_3)$$

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45 in the present time frame. But if this were the case, it would hardly be the perceived expected earnings of the students and no *ex ante* rates of return could be calculated.

is applied to the above data with the starting earnings for graduates and non-graduates at 1,500 and 3721 respectively; at the age of 26 they are estimated to be 7,787[50] and 5,884 respectively and at the age of 46 they are 14,504[51] and 9,380 respectively. The total perceived lifetime earnings for male graduate and non-graduate are as follows:

Graduate (male)

$$ELE_1 = 0.5(26 - 18)(1,500 + 7,787) + 10(7,787) + 29(14,504)$$

$$= 535,634$$

This is 72,156 (11.9%) less than the age 18-65 lifetime income of 607,790.

Non-graduate (male)

$$ELE_2 = 0.5(26 - 18)(3,721 + 5,884) + 10(5,884) + 29(9,380)$$

$$= 369,280$$

Here the difference is 35,876 (8.85%) between 369,280 and age 18-65 lifetime income of 405,156.

If we assume that factors (i) and (ii) stated above have taken their effects, the difference due to (iii) is not

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[50]. Income at age 26 of Bosworth and Ford's Table 1 (1985, p25).

[51]. Income at 46 of Bosworth and Ford's Table 1 (1985, p25).

much in term of lifetime earnings. It is therefore argued that the difference between the income streams of two surveys are due more to inflation and different samples than to the methods used.

4.12 Ways to calculate the expected lifetime earnings and the internal rate of return in the present study

In the analysis of the earnings function, it is necessary to calculate the expected lifetime earnings. Williams and Gordon (1981) used the data of the expected earnings of the students at the start of work, at the age of 26 and 46 in the following formula[52]:

$$ELE = 0.5(26 - A)(E_1 + E_2) + 10(E_2) + 29(E_3) \quad \ldots\ldots\ldots(1)$$

Where

ELE = Estimated expected lifetime earnings
A = Age of starting full-time work
E_1 = Expected earnings when starting full-time work
E_2 = Expected earnings at age 26
E_3 = Expected earnings at age 46

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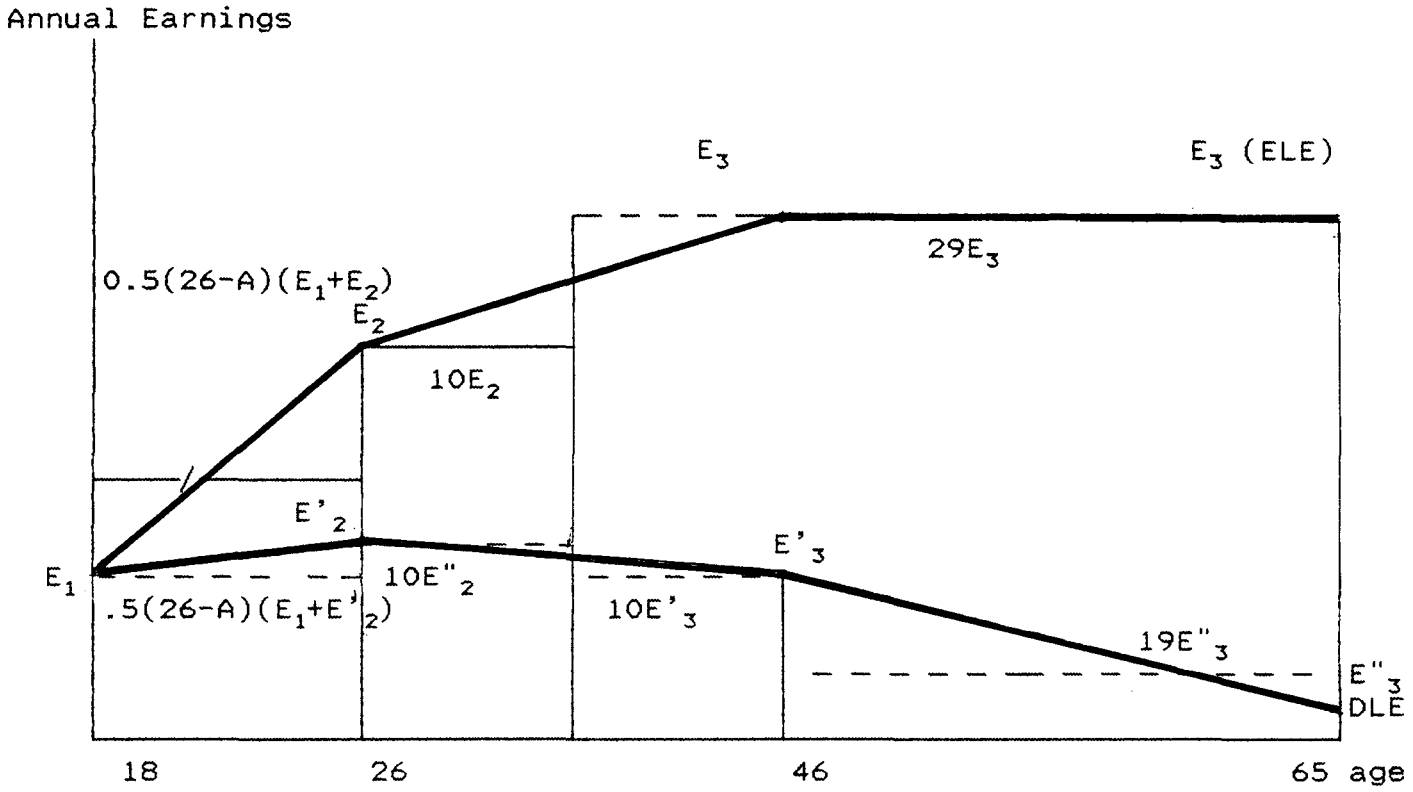
[52] In the formula used by Williams and Gordon (1981), student grant was included. In Hong Kong less than 40% of the students in higher learning institutions received grants (Bray, 1986). Hence grants are not considered income element for those who intend to enter higher learning in Hong Kong.

Since the expected earnings of the students refer to the future, in order to calculate the internal rate of return, these earnings streams are to be converted into the 'present value'. In so doing, a rate of interest known also as the internal (or private) rate of return - which represents the interest generated by the investment is included. The discounted form of the estimated expected lifetime earnings with private rate of return 'r' is as follows:

$$DLE = 0.5(26-A)[E_1 + (E_2)(1-r)^{(26-A)}] + 10(E_2)(1-r)^{10} + 10(E_3)(1-r)^{30} + 19(E_3)(1-r)^{49} \quad \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

In graphic:

Figure 4.1
Discounted expected lifetime earnings



Where

E_1	=	Expected starting earnings
E_2	=	Expected earnings at 26
E_3	=	Expected earnings at 46
$E'_{.2}$	=	$(E_2)(1 - r)^{(26-A)}$
E'_2	=	$(E_2)(1 - r)^{(36-A)}$
$E'_{.3}$	=	$(E_{3)}(1 - r)^{(46-A)}$
E'_3	=	$(E_{3)}(1 - r)^{(65-A)}$
r	=	rate of return
A	=	age of starting work
E_1--E_3	=	Expected age earnings profile (ELE)
E_1--E''_3	=	Expected age earnings discounted at 'r' per year (DLE)

This discount formula takes the following form:

$$V = \sum_{t=1}^{n} E_t (1 - r)^t \quad \text{.....(3)}$$

where V = earnings stream
n = length of working life
E_t = marginal earning of student in t year
r = discount rate (the internal rate of return)
t = year

This is at variance with the formula of bringing the discounted future earnings to the present value as suggested by Blaug (1970, p.54-57):

$$V = \sum_{t=1}^{n} \frac{E_t}{(1 + r)^t} \quad \text{.....(4)}$$

Formulae (3) and (4) are used to estimate the internal rate of return after knowing the values of earnings in each year (E_t) and the length of working life (n). Both formulae are rough estimation and the internal rate of return estimated by formula (3) differs only slightly from formula (4).

Then the earnings function of the following is regressed:

$$DLE = a + \beta_1 UE + \beta_2 LS + \beta_3 A + \beta_4 SX + \beta_5 FB + ...$$

Where β_1 and β_2 are the coefficient of the regression, and the value of which determines the influence of UE (Intention to enter University Education) and LS (Intention to Leave School after Form V) on DLE. In the above formula (2)

$$DLE = 0.5(26-A)[E_1 + (E_2)(1-r)^{(26-A)}] + 10(E_2)(1-r)^{10} + 10(E_3)(1-r)^{30} + 19(E_3)(1-r)49$$

when r = 0, DLE = ELE [the Discounted Lifetime Earnings (DLE) is equal to Estimated Lifetime Earnings (ELE)]

When $0 < r < 1$ (r is between 0 and 1), the effect is to reduce the explanatory power of University Education (UE) and Leaving School (LS) upon the Lifetime Earnings - the dependent variable.

Since most of the anticipated higher earnings associated with higher education occur later in life, hence the higher is the r (when r is close to 1), the lower is the value of $ß_1$ and $ß_2$. When $ß_1$ equals 0, the intention to enter university education has no net gain on Discounted Expected Lifetime Earnings. Thus we can choose the r so that $ß_1$ equals 0. This corresponds to the rate of discount at which the average expected net benefit from university education rather than school leaving after post-secondary education at 19 is zero. When this happens, argued Williams and Gordon (1981, p218-20), the r corresponds to the perceived internal rate of return. Similarly, the value of r where $ß_2 = 0$, gives the perceived rate of return to enter post-secondary education as opposed to school leaving after Form 5. In this way, the perceived internal rate of return is estimated.

4.2 Areas of Investigation

In this study, the private rate of return of Human Capital Theory and the investment in education as a signal of the Signalling hypothesis are applied to the problems described in Chapter One and Two. Specifically this study investigates in Hong Kong:

A. whether students are motivated by economic considerations for higher education and the extent of this influence;

B. the extent to which students are aware of their ability;

C. the effect ability has on the capable students in the pursuit of higher learning;

D. the influence of students' socioeconomic background, quality of institutions, sex and abilities on

   i) the pursuit of higher education
   ii) on the perceived lifetime earnings and

E. the perceived *ex ante* rates of return to higher education.

The questionnaire method is used as the main instrument to gather data, information and views of the Hong Kong students on their education intentions and a host of other information.

4.21 Students' economic motivation and higher learning

Students' aspiration for higher education has been a subject of concern of many scholars and a number of distinct and often contradictory hypotheses have been advanced. One of the oldest was the consumption theory which argues that students derive immediate satisfaction from education. The arguments of parental and peer influence on educational plan has always been strong (Duncan etc., 1974; Davies & Kandel, 1979). Then there is Human Capital Theory which puts emphasis on the economic consideration and which has dominated the scene in the 60's and 70's (Blaug, 1960; Becker, 1975).

In the present study, the motivation of the students for higher learning or otherwise is to be assessed by asking the students to agree or disagree reasons for higher learning set out in a five-point scale. These include:

1 I enjoy studies
2 I am good at school work
3 I will get a better job if I carry on with my education
4 I want to have a better chance in competing with others
5 My friends are staying in school
6 I feel people should get as much as education

as they can
7 My parents think I should stay on
8 I need more education for the kind of job I want

Items 1, 2 and 6 are factors belonging to the consumption view of education; items 3, 4 and 8 are the factors of economic consideration and items 5 and 7 are the factors of social influence. At the end of the questions, they were asked to put down among the listed items the most important one. The motivation of the students for higher learning is based on this last information. As in many other studies, it is assumed that the Hong Kong students are economically driven for higher learning. In order to test this assumption, the Nonparametric Test of One Sample Chi-square will be applied to the data and the significant level is taken at 0.05.

4.22 Students' awareness of their ability and the effect of ability on the demand for higher learning

The testing of students' awareness of their own ability and the effect ability has on the capable students are based on the Signalling hypothesis. According to this theory students are conscious of their relative ability in school and because of the hiring

requirements, those who are capable would tend to invest more in higher education. As explained in Chapter 2, secondary and higher education are mainly provided by the government in Hong Kong. Hence it is hardly possible to test directly whether students are responding to employment requirements in their demand for higher education[53].

In the present study, the Form V students who were at the end of the secondary education were asked to indicate whether they would cease studying or stay on for higher studies after Form V. For those who had chosen studying, they were asked the highest qualification they intended to get and the institutions they would choose to study in. Since the continuation of education to post-secondary and beyond requires a minimum of academic results in HKCE (refer to Chapter 2 for specific requirement), the students' academic results are taken as indications of their abilities. The survey of the students' education intentions was conducted in early March, 1986, two months before they

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[53]. Blaug (1976, p836) argued that in countries where higher education was effective rationed by the state, it was virtually impossible to test the hypothesis that subject choice in higher education was sensitive to earnings. The United States was the only possible exception.

sat for the HKCE. The release of the individual's results in August was used to ascertain whether students' intentions for higher learning are related to their actual performance in HKCE.

Given the excess demand for higher education in Hong Kong, it is just possible that most of the students desire higher leaning regardless of their academic ability. But if the signalling view is true, there should be a close relationship between higher ability and the intention for further education.

Among those who chose studies after Form V, they were asked to indicate their ultimate educational goal. The majority chose post-secondary education. A smaller number preferred university education. If the signalling view is supported, it should be able to show that those preferred university education are better in their ability than those who chose post-secondary education.

Furthermore, in the questionnaire, the students were also asked to choose the form of study after Form V and the tertiary institutions for post-secondary and university education. There is a generally accepted hierarchy in the form of study and in the tertiary institutions. Again, if the choice of the form of study

and tertiary institutions is ability related, it provides another indication of consistence of the relationship between student's ability and their intention for higher learning. If these two pieces of evidence could be established, the students' awareness of their ability is implicitly implied.

In order to carry out the test, the Chi-square analysis will be applied to the data and the observed significant level is taken at 0.05.

4.23 Factors which affect the demand for higher learning and the perceived lifetime earnings

Investigations are here made to see:

(a) the extent of the interactive influence of socioeconomic background, quality of institution, sex, Art or Science streams and ability on the demand for higher education.

(b) the impact of these factors on the perceived lifetime earnings of the students with different careers intentions.

Item (a) is an investigation of the social influence on students' educational planning. There has been a large volume of studies on this topic (Sewell & Haller, 1965; Husen, 1975; Duncan & others, 1975; Sewell & others, 1976; Sewell & Shah; Halsey, 1980) which

established that both socioeconomic status and intelligence are positively and significantly related to educational planning for both sexes. The OECD report 'Individual Demand for Education' (1979) has identified three groups of psychological and social factors which affect the students' demand for higher education[54]. These factors are:

1. The Psychological/Individual factor

   Individual's attitude towards education and work and the planning of his own life affect his reaction to different lifetime opportunities. Sex role stereotyping is another major determinant of one's career choices. Often girls are considered to be more 'linguistically' than 'mathematically' inclined and are better at the arts rather than science subjects.

2. The Structural/Institutional factor

   Students are primarily motivated by their previous educational experience. The structure of curricula and courses offered in the secondary level is most important in affecting students' demand for higher education. Other factors include streaming within the school and separation of schools according to different curricula - two frequently used methods to match students' aptitudes and abilities with curricular possibilities.

3. The Social/Familial factor

   Due to the influence of home environment, measured essentially by the father's occupation and parents' education, children from different social origins

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[54]. The OECD report has identified four groups of factors. The last group is the Economic/ Financial factor which is based on the Human Capital Theory. Since this aspect will be dealt with in other section, it is omitted here.

> react differently to occupational and educational opportunities. Success in education is closely linked with family background where encouragement and aspirations are abundant and forthcoming. On the contrary, students from working class have a higher rate of leaving schooling after compulsory education, and

However, though grouped differently, these factors are not competing explanatory models for the demand for higher education. It is possible that a combination of these factors may be better in explaining the change of demand for higher learning. In the following sections, the relatively contribution of the factors of sex, quality of institution, Art/Science stream, and socioeconomic factors of father's occupation and parents' education on the students' demand for higher education will be examined. In the analysis, other than Chi-square package, the test of the interactive influence is dependent on Log-linear models which are used for categorical data (Goodman, 1972; Norusis, pB183-201). In the Log-linear models, all variables that are used for classification are independent variables and the dependent variable is the number of cases in a cell of the crosstabulation. The natural logs of the cell frequencies are expressed as a function of the different variables and their interaction (referred to as the saturated log-linear model which includes the main and interactive effects) as follows (a three-

variable model)[55]:

$$\text{Ln } F_{ijk} = \mu + V_i^A + V_j^B + V_k^C + V_{ij}^{AB} + V_{ik}^{AC} + V_{jk}^{BC} + V_{ijk}^{ABC}$$

where Ln F_{ijk} = observed log frequency in the cell ijk
μ = mean
V_i^A = the effect of the ith value of A variable
V_j^B = the effect of the jth value of B variable
V_k^C = the effect of the kth value of C variable
V_{ij}^{AB} = the interactive effect for the ith and jth value of A and B variables
V_{ik}^{AC} = the interactive effect for the ith and kth value of A and C variables
V_{jk}^{BC} = the interactive effect for the jth and kth value of B and C variables
V_{ijk}^{ABC} = the interactive effect for the ith, jth and kth value of A, B and C variables

The μ and parameters (V_i, V_j ....) of the model based on which interactive effect of the variables are to be checked will be estimated from the data (the μ is the average of the logs of the frequencies in all table cells and the parameter is the average log of the frequencies in a particular category minus μ). A Chi-square Goodness of Fit (Likelihood ratio chi square) test is to be applied to the investigation of the hypothesis that the higher-order interactive effects of the variables (V_{ijk}^{ABC}) are zero. The null hypothesis

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[55]. If variable are independent they can be represented by a log-linear model that does not have any interaction terms as follows:

$$\text{Ln } F_{ijk} = \mu + Vi^A + Vj^B + Vk^C$$

assume all higher order interactive effects are zero. If the observed significant level of the Likelihood Ratio Chi-square value is very small (smaller than 0.05), the null hypothesis is rejected which means that interactive effects among the variables exist. The Likelihood Ratio Chi-square is calculated as:

$$L^2 = 2\Sigma\Sigma_{ij} F_{ij} \text{ Ln } \frac{F_{ij}}{F_{ij}}$$

Where L^2 = Likelihood Ratio Chi-square
F_{ij} = observed frequency in the cell ij
F_{ij} = expected frequency in the cell ij

If without higher-order interaction terms the model fits the data well, the simpler models are usually preferred because higher-order intersection terms are difficult to interpret. Similar to the selection of appropriate variables in the Multiple Regression, the Backward Elimination method would be applied to determine whether a model with first- and second-order effects is adequate to represent the data. However, it is possible that in the models of lower-order effects, there may still be some models which do not fit the data. The Backward Elimination method is further employed to remove those that do not satisfy the criterion for remaining in the model (usually the effect the removal would result in

the least-significant change in the Likelihood-Ratio Chi-square). The final model will contain all the lower-order interactions which have the observed significant level of the Likelihood-Ratio Chi-square smaller than 0.05 and will fit the data.

Item (b) of p122 is an investigation of whether quantity of education is seen as the main factor which affects the lifetime earnings of an individual. According to the Human Capital Theory (refer to Chapter 3.15), the influence of the other factors should be minimal when compared with the quantity of education. The investigation is centred around the earnings function and the application of the multiple regression analysis to find out the impact of the independent variables - the expected level of schooling, socioeconomic background, quality of institutions, ability, sex, streaming and dual attitudes towards work upon the perceived lifetime earnings - the dependent variable.

In order to carry out the investigation of the effect of education, ability, quality of institution and other factors on the perceived lifetime earnings, a general earnings function of the following model is used:

$$\text{Ln ELE} = f\ (UE, LS, FB, S, QI, CA, A/S, PE_1, PE_2, AR, DG)$$

where Ln ELE = log estimate lifetime earnings
UE = Intention to enter university education
LS = Intention to leave school after F.5
FB = Family background
S = Sex
QI = Quality of institution
CA = Cognitive ability
A/S = Arts or Science stream
PE1 PE2 = Parents' education
AR = Attitude to risk in employment
DG = Propensity to defer gratification

The variables included in the model are defined as follows:

Ln ELE = Log Expected Lifetime Earnings

The Williams and Gordon's method of calculation of the expected lifetime earnings is adopted here. These are calculated for each student on the basis of his/her respective expected earnings when he/she started work, at the age of 26 and again at 46. It is assumed that earnings rise linearly between these points, that the peak earning is at 46 which remains so until retirement at 65. In the calculation of the expected earnings of students, no adjustment is made on the foregone earnings of those who were preparing to enter university.

UE, LS = Intention to enter University Educational/
Intention to leave School after Form V

The intention to enter university education, post-secondary and to leave school after Form V for work are treated with two dummy variables UE and LS and are assigned with the following values:

UE = 1	Intention to continue university education	0 = otherwise
LS = 1	Intention to leave full -time education after F. V	0 = otherwise

The intention to undertake post-secondary education is when both UE and LS are zero. In the multiple regression equation, the variable of UE is interpreted relative to the reference of post-secondary education. Likewise, LS is interpreted relative to the reference of post-secondary education. UE (university education) is expected to be positive, showing the average anticipated increase in earnings associated with entering university while university education has a higher value than post-secondary education. On the other hand, LS (leaving school) is expected to be negative, showing the loss of earnings associated with leaving school at 17.

S = Sex

Sex is treated as an independent dichotomous variable where male = 1 and female = 0. Sex is expected

be positive for boys, showing the higher average expected lifetime earnings than the girls.

A/S = Arts/Science Stream

The proportion of students who chose Arts or Science stream in the sample is about equal. However, more boys chose Science stream and more girls chose Arts stream. Science is assigned a value of 1 and Arts 0. It is expected that the Science students would expect a higher lifetime earnings than the Arts students.

CA = Cognitive Ability

The students' results in the HKCE 1986 are taken as their cognitive abilities. Students took an average of 8 subjects in the examination. Their best four subjects are chosen together with English. The results of the subjects are graded from A to F with U representing the unclassified score. The grades are reassigned a value of 1 to 7 as follows:

Grade A (distinction) = 7 Grade B (credit) = 6
Grade C (credit) = 5 Grade D (pass) = 4
Grade E (pass) = 3 Grade F (fail) = 2
Grade U (unclassified) = 1

CA = Eng + best sub 1 + best sub 2 + best sub 3 + best sub 4

It is anticipated that students with higher grades in

the HKCE will expect higher lifetime earnings.

QI = Quality of Institution

In Hong Kong, the quality of institution in secondary education is created along the line of students' ability[56]. A quality index for each school is thus created which is based on the average of the best five subjects of all the students of a school in HKCE:

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[56]. As explained in Chapter 3.14, one of the difficulties in this kind of study is to determine the quality index to be adopted for analysis. In the present study, school expenditure is ruled out from the start since the schools in the present study are largely aided schools which are supported by the government under the same mode of finance. Psacharopoulos (1975) argued that 'high expenditure does not necessarily mean better quality because 'the efficiency with which the school budget is used is not made explicit'. Quoting Hanushek, Solmon (1987) further pointed out the weakness of expenditure (per study) as a good predictor to reveal teachers' characteristics such as verbal ability and educational experience.

With the availability of data, the average ability of the students in the HKCE results is adopted here instead as the quality index for the schools. One of the drawbacks in looking at the achievement test as quality measures of school is that these end products of schools ignores the input of students and the process of education itself (Solmon, 1987). However, in Hong Kong where the continuation of further education dependents solely on one's academic merits, the choice of students ability as quality of schools is not without its relevance to the situation.

	High Quality	Middle Quality	Low Quality
No of school	4	11	7
No of students	275	753	524
Index range[57]	4.19 - 4.75	2.86 - 3.72	1.00 -2.38

It is expected that the institutions of High Quality will correlate more with expected higher lifetime earnings than Middle and Low Quality institutions.

FB = Family Background

The stated father's occupation is used to measure family background of the respondents and is classified into six social categories, 3 non-manual and 3 manual classes. Those with father in non-manual jobs are assigned 1, those with manual occupations are assigned 0. Hence those from non-manual homes are expected to be positive indicating a higher average expected lifetime

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[57]. The average of the best five subjects including English of the students in a school in HKCE are taken, where

6 = average of 5 distinctions and/or B credits,
5 = average of 5 C credits,
4 = average of 5 D grades,
3 = average of 5 E grades; the E grade is considered the passing grade,
2 = average of 5 F grades and
1 = average of 5 Unclassified

earnings than those from manual homes.

PE1 PE2 = Parents' Education

The stated Father's and Mother's education of students is also used to measure the influence of family background. Both Father's and Mother's education are divided into no schooling, primary, secondary and post-secondary and are assigned the value of 1 to 7 as follows:

No schooling	1
Lower primary	2
primary	3
Junior secondary	4
Senior secondary	5
Post secondary	6
University	7

The Father's education is found to be closely correlated with Mother' education (correlation index=0.6995) and the two are aggregated for analysis. The corresponding value for largely primary, secondary and post-secondary of parent's education are as follows:

		No of parents
largely primary	1 - 5	811
largely secondary	6 - 9	564
largely post-secondary	10 - 14	211

Like students' intentions for study and work, PE1 and PE2 are treated as two dummy variables and are

assigned the following value:

PE1 = 1	Parents' education is largely primary	0 = otherwise
PE2 = 1	Parents' education is largely pose-secondary	0 = otherwise

When both PE1 and PE2 are zero, parents' education is largely secondary. It is anticipated that students with parents who had a higher educational attainment will be positively related to higher lifetime earnings. On the contrary, students whose parents had largely primary education will be negatively related to higher lifetime earnings.

AR = Attitude to Risk in Employment

An index was constructed with scores 0 - 8 depending on the expressed opinion with the following characteristics:

> 'A job where pay is about average but where there is little risk of being unemployed '

This variable gives an indication of the extent to which the respondents preferred to trade off job security with high income. It is anticipated that those who were willing to trade off job security will have a higher value which signifies a higher lifetime expected

earnings than those who showed reluctance to give up a secure but lower paid job.

DG = Deferment of Gratification Index

This is an index given to each respondent ranging from 0 to 8 based on the extent to which he agreed with the following statement:

> 'A job with good pay to start off with but without much chance of promotion.'

High scores, hence higher perceived lifetime earnings, on this index were expected by respondents willing to defer gratification.

The multiple regression is applied and the values of the coefficients of the independent variables are estimated (at 0.05 observed significant level) to determine whether these variables are important predictors of the perceived lifetime earnings. The extent of the variation of the dependent variable to be explained by the regression equation is dependent on the value of the coefficients of the determination (R^2 also known as the goodness of fit). The greater the coefficient of the determination, the more reliable will be the prediction and the estimates based upon the

model.

After the overall study of the effect of the independent variables upon the dependent variable, the interaction between ability, quality of schools and socioeconomic background will be studied in more detail. This is intended to detect the evidence of the interaction between ability, quality of schools, family background, educational intention and the expected lifetime earnings.

The last part of the study is to calculate the perceived rates of return to higher education by solving (estimating the 'r') the discounted formula of the expected lifetime earnings[58]:

$$DLE = 0.5(26-A)[(E_1) + (E_2)(1-r)^{(26-A)}] + 10(E_2)(1-r)^{(36-A)} + 10(E_3)(1-r)^{(46-A)} + 19(E_3)(1-r)^{(65-A)}$$

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[58]. This is a slightly revised formula from the original one suggested by Williams and Gordon (1981, p217):

$$DLE = 0.5(26-A)[E_1 + (E_2)(1-r)^{(26-A)}] + 10(E_2)(1-r)^{10} + 10(E_3)(1-r)^{30} + 19(E_3)(1-r)^{49}$$

4.3 Collection of Data

A questionnaire based on the one by Williams and Gordon (1981) was constructed to gather the information (see appendix for a copy of the questionnaire).

In view of the fact that the students' response to the questionnaire is voluntary and that consent must first be obtained from the school authorities concerned, special considerations were given to the way the questionnaire was conducted and the time element in answering the questionnaire. For this reason the IQ test in the questionnaire by Williams and Gordon is deleted. To overcome the difficulty of timing, the questionnaire was designed for about 30 minutes long so that students can finish it within a class period which is 40 minutes in duration.

After the completion of the draft version of the questionnaire, a trial run was made in October 1985 in four schools to test the individual items and the data were used for initial analysis. Most of the items in the questionnaire are straightforward which requires little interpretation. As expected, it was found that many students had difficulty in estimating future earnings.

Since it was crucial that students should have a uniform understand of the item in future earnings, the presence of the writer inside the classroom to answer queries was found necessary. In the actual process of conducting the questionnaire, the writer was present in almost every classroom to explain the meaning of 'ignoring the effects of inflation' and to answer queries. On two occasions when the writer was not available, the Careers Master/Mistress of the school was briefed beforehand. When answering the question, the students were asked to make a reasoned guess if in doubt, and the girl students were asked to assume that they would continue working after marriage. This was justified since the aim of the study is to obtain a general picture of the working world they would enter with their different education intentions, not to force them to make artificial calculations.

The questionnaire was conducted among the Form V students who are at the end of their secondary school education. There are obvious reasons why the careers intentions of the Form V students are focused upon instead of the Form III students who are in the last year of the compulsory education. These include:

First, almost 90% of the Form III students continue

their education up to Form V in government, aided or private schools, hence the difference between Form III and Form V in terms of number is small.

Second, all Form V students have to sit for the HKCE at the end of the academic year and the examination results could be used as proxy for individual ability and quality index for schools.

Third, after Form V, over half of the students enter the labour market. It is after Form V that diversified careers emerge. Since a large number would leave Form V for work, it would be possible to obtain a sufficient number of 'potential workers' to compare with the 'continuing students' for analysis.

Last, From V students are two years older than their Form III counterparts, hence are more mature to handle some of the difficult questions in the questionnaire.

In order to obtain a wide cross section of the Form V student population and to facilitate the study, the Hong Kong Association of Careers Masters and Council Masters (hereafter referred to as HKACM) was approached for assistance. HKACM has a total membership of 388

schools, comprising 36 government, 276 aided and 75 private schools. According to the half-yearly Statistics Summary of September, 1985 of the Education Department, there were 36 Government, 281 Aided and 107 Private secondary schools. Membership of HKACM includes almost all the secondary schools in Hong Kong. In January 1986, a stratified randomization was made to select 22 secondary grammar schools from the membership of HKACM[59]. This sample is made up of 2 government, 15 aided and 5 private schools with a total of 1621 students, 59.7% being girls and 40.3% being boys. Among them, one is a boy school, three are girl schools and eighteen are coeducational schools. The breakdown of the percentage of the sample among secondary schools in Hong Kong is shown in Table 4.1[60].

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[59]. The pre-vocational schools are not included in the present study because unlike grammar schools, they have a clear work-oriented aim and deserve a separate study of their own.

[60] Figures of schools and student numbers are based on the Half-yearly Statistics Summary, September, 1985 of the Education Department.

Table 4.1
The basic data

	GOVERN'T SCH	AIDED SCH	PRIVATE SCH
1 No of school in sample	2	15	5
2 No of school in Hong Kong	37	281	107
3 1/2 in %	5.4	5.3	4.6
4 No of student in sample	152	1123	344
5 No of student in Hong Kong	5984	44165	17548
6 4/5 in %	2.5	2.5	2.0

In early February, a letter from the writer explaining the purpose of the survey and a covering letter from the Secretary of HKACM asking its members to assist in the survey together with a copy of the questionnaire were sent to the Principals and the Careers Master/Mistress of the selected schools. They were requested to choose on their own discretion a class of science and a class of arts students to answer the questions. Of the twenty two schools, one government school rejected the request, one aided school promised to assist but because their students were engaged in internal examination, the survey did not take place and one private school had been dissolved. These schools were replaced by other substitutes. The Survey was carried out from mid February to early March, 1986. The writer went to the individual schools and with the assistance of the Careers Master/Mistress of the school

the questionnaire was explained to the students inside the classrooms. The students were asked to put down their name and to complete the questionnaire on personal data. On the part of different careers intentions, students were asked to estimate what they would do after Form V. Those who chose working were asked to answer a set of multiple-choice questions on reasons of their choice; those who chose studies would have to indicate whether they would continue into university education. The 'study' students were asked to answer a different set of reasons for their choice. Then both groups of students were asked to estimate their earning expectations at the start of their working life, at the age of 26 and 46 (they were asked to ignore the inflation factor), their family background (parents' job and education) and their opinions on a number of questions (A sample of the questionnaire in both English and Chinese is attached in the Appendix I).

With a few exceptions, a total of 1621 students returned completed or nearly completed questionnaires[61].

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[61]. In the residual plots of the regression analysis to locate outliers, it was found that there were 13 cases which had very large positive or negative residuals (greater than +3.16 or less than -3.16 in the histogram). These cases were excluded in the analysis. Hence the number of cases for regression analysis stood at 1608.

In September, the Hong Kong Examination Authority was approached and with their kind consent, the results of the individual students were obtained and were regarded as measures of the abilities of the students. 1590 cases were identified and were used for analysis.

CHAPTER 5 ANALYSIS OF DATA AND STUDENTS' AWARENESS OF THEIR ABILITY

5.0 Introduction

This chapter sets out to analyze the data of the study, in particular the factors which are related to the demand for higher education.

The first part of the chapter examines the motive of the students in their demand for higher education. Other than the economic consideration, the consumption view is also presented. The second part attempts to analyze some of the effects of the variables of father's job, sex, Arts/Science streaming, parents' education, quality of schools and achievement in HKCE on the demand for higher education. Log-linear models of the simplest form is applied to the data to examine the interactive effects of the variables.

The third part of the chapter uses Log-linear modal to examine the relationship between students' intentions for higher education and their ability. According to the Signalling Hypothesis, students are aware of their ability and the capable ones would invest more in higher education. The study is able to show that there is a

clear relationship between ability and those who opted for work as well as those who opted for study. Among those who preferred continuous education, their choice of studies and higher institutions is also ability-related.

5.1 The Reasons Which Affect Students' Education Intentions

Is Hong Kong students' main motivation for higher education economically driven? In the questionnaire, the students were asked to indicate whether they would carry on with studies or start working after Form V. A series of reasons were provided for their choice and the students were asked to give the main reason for their decision. The data of this finding is analyzed.

The results in Table 5.1 show that the majority of the students who intended to carry on study after From Five stated that their main reason was related to economic considerations.

Table 5.1
Main reasons given by students who intended to study after F.V
(No. of Cases = 1206)

REASON FOR STUDY	% (ALL)	% (GIRLS)	% (BOYS)
1 Enjoy study	11.3	13.7	7.4
2 Good at school work	1.2	1.3	0.9
3 Will get better job	43.2	41.1	46.7
4 To have better chance in future	11.5	8.5	16.5
5 Friends stay in school	0.2	0.1	0.2
6 People should get more education	10.9	13.3	7.2
7 Parental wish	3.8	3.5	4.3
8 Need more education for expected job	17.6	18.3	16.7

Among those who plan to study, 43.2% of the students believed they would get a better job if they stayed on in education; 11.5% felt that they could have a better chance to get a good job and 17.6% thought they needed more education for the expected job, making a total of 72.3%. Only a minority of students (22.2%) subscribed to the view that studying was for the sake of education (items 1, 2 and 6). The peer influence on the careers choice of the students of the two groups was minimal.

When the main reasons given by students for their choice are grouped under the separate headings of

economic reasons (items 3, 4 and 8), consumption views (items 1, 2 and 6) and parental and peer influence (items 5 and 7) for a One-sample Chi-square analysis (Table 5.2), the Chi-square value is 887.216, being significant at $p < 0.0001$. This demonstrates that there is difference in the choice of reason for higher studies. One can therefore argue that the Hong Kong Form V students have different reasons for higher learning and the reasons are more related to economic consideration than otherwise[62].

Table 5.2
One sample Chi-square based on main reasons for study

Main reason	Case	Expected	Residual
The Consumption View	282 (23.6%)	398.00	-116.00
The Economic Reason	864 (72.3%)	398.00	466.00
Parental & Peer Influ	48 (4.0%)	398.00	-350.00
Chi-Square = 887.2		p < 0.0001	

A breakdown of the three main reasons according to boys and girls (Table 5.3) show that boys are different from girls in their choice of the main reason for

[62] In a similar study by Gordon and Williams (1979), the date were not tallied in the same way. No comparison is made.

further studies.

Table 5.3
Main reasons for study according to sex (in%)

MAIN REASONS	SEX	
	Girls	Boys
Consumption views	28.6	15.5
Economic reasons	67.8	80.1
Peer influence	3.7	4.4
No of cases	739	452
Chi-Square = 26.56 P < 0.0001		

There are almost twice as many girls than boys (28.6% against 15.5%) who subscribed to the consumption view of education. On the other hand, more boys than girls (80.1% against 67.8%) put emphasis on economic factors in their choice of the main reason for further studies. Boys and girls are significantly different in their reasons for higher studies.

On the other hand, a study on the reasons given by those students who opted for working after Form V (Table 5.4) shows that only 24% (381 out of 1587) students intended to cease study after Form V. In Hong Kong where the drive for higher qualifications is so keen, it is

not surprising to find only this small number of students who voluntarily chose working after Form V. Among this group of students, about 1/3 (28.3%) wanted to work in order to have one's own money and another 7.6% believed it would be easy to get a job after Form V, making a total of 35.9%, who were attracted by economic reasons to leave school at this level. The majority of them, 55.9% felt that work was preferable to study because they were not good at school work. It is likely that leaving school at this stage was not their first choice. If they had performed better in school, they would have chosen to continue with studies.

Although there are differences between boys and girls in their main reasons for work after Form V, the differences are not substantial.

Table 5.4
Main reasons given by students who intended to cease study after F.5
(No. of Cases = 379)

	REASON FOR WORK	% (ALL)	% (GIRLS)	% (BOYS)
1	Don't like school	5.8	5.4	6.1
2	Not good at school work	55.9	56.9	54.7
3	Friends leave school	2.4	1.5	3.4
4	To have one's own money	28.3	30.2	26.3
5	Easy to get job now	7.6	5.9	9.5

It is interesting to find that in the 'Case Study United Kingdom' by Gordon and Williams (1979), a similar percentage (about 1/3) of fifth-form leavers wanted to earn some money immediately. But the percentage of leavers for academic reason was only 15% as compared to the present study of 55.9% and the 'fed up' rate for school was 38% for boys and 45% for girls as compared to the present findings of 5.1% and 6.4% for boys and girls respectively. Husen (1979) observed that students in the affluent, industrialized countries tended to be negative towards schooling whereas students in developing countries were more positive. This finding of the present study seems to support Husen's observation. It is possible of course that the difference is due to the emphasis placed by the Chinese culture on education.

5.2 The Influence of The Factors on The Demand for Higher Education

In the following sections the relationship between students' demand for higher education and the following factors of the students will be studied:

Highdeg (Education Intention)
Fajob (Father's occupation)
Sex
Stream (Arts/Science streaming)
Parented (Parents' education)

School (Quality of institution) and
Ability (Achievement in HKCE)

Table 5.5 examines the mean, standard deviation of the variables. The values of the standard deviation of the variables measure the variability of the scores. As a whole, the scores of the different variables do not deviate widely from one another.

Table 5.5
Mean and standard deviations of the variables

Variable	Label	Mean	Std Dev	N
Highdeg	(Education intention)	1.99	.70	1599
Fajob	(Father's job)	1.29	.45	1533
Sex		1.40	.49	1607
Stream	(Arts/Science streaming)	1.46	.50	1608
Parented	(Parents' education)	1.63	.71	1586
School	(Quality of institution)	1.80	.73	1608
Ability	(Achievement in HKCE)	3.14	1.39	1552

Table 5.6 examines the Correlation of the variables. The Table reveals a rough picture of the correlation among the variables. While Father's Job, Streaming, Parents' Education, Ability and Quality of Institution are significantly (at 0.001 level) correlated with the Demand for Education, Ability and Quality of Institution (with the coefficients of .4901 and .3941 respectively) have a higher correlation. Besides, Father's Job is

highly related with Parents' Education (0.4896); Sex is highly associated with Art/Science Streaming (0.3768) and Students' Ability is highly correlated with Quality of Institution (0.5926). Other than this, correlation also exits among Father's Job, Quality of Institution and Ability and among Parents' Education, Quality of Institution and Ability.

Table 5.6
Correlation of the variables

	Highdeg	Fajob	Sex	Stream	Parented	School	Ability
Highdeg	1.0000						
Fajob	.2103**	1.0000					
Sex	-.0266	-.0698*	1.0000				
Stream	.1635**	.0403	.3769**	1.0000			
Parented	.2330**	.4896**	-.0812**	.0304	1.0000		
School	.3941**	.1321**	-.0727*	.0516	.1709**	1.0000	
Ability	.4901**	.1174**	.0038	.1865**	.1208**	.5929**	1.0000

* significant at .01 ** significant at .001

In the demand for higher education, the various factors of sex, quality of institution, Art/Science stream, and socioeconomic factors of father's occupation and parents' education do not exert their influence independently. A student's ability may be related to his/her home environment and schooling. Arts subjects are more pursued by girls than boys. Students who attend high quality schools may come from families where the

parents have a higher education standard. The Chi-square analysis is limited in its capacity to handle these interactive effects. To examine the interaction of the variables which are categorical data, the Log-linear models of the simplest form are used (using the variables of Sex and Arts/Science Stream as an example):

$$\text{Log } F_{ij} = M + V_i^{\text{sex}}_{\text{male}} + V_j^{\text{stream}}_{\text{science}} + V_i^{\text{sex}}_{\text{male}} V_j^{\text{stream}}_{\text{science}}$$

where F_{ij} = observed log frequency in the cell ij

M = Grand Total average

$Vi^{\text{sex}}_{\text{male}}$ = the effect of the ith Sex category

$Vj^{\text{stream}}_{\text{science}}$ = the effect of the jth Arts/Science category

$Vi^{\text{sex}}_{\text{male}}\ Vj^{\text{stream}}_{\text{science}}$ = the interactive effect for the ith value of the sex category and the jth value of the Arts/Science Stream variable

As explained in Chapter 4.23, among all the factors which have interactive effects, there could also be a number of combination of variables (modes) which are related with the demand for higher education. The Likelihood-ratio Chi-square (L^2) is applied to test the hypothesis that the higher-order interactive effects of the variables are zero (the '*K*-way and Higher-Order Effects are Zero Test'). If the observed significant level of the likelihood-ratio chi-square of the higher-

order effects is large (bigger than 0.05), the null hypothesis is not rejected which means that no interactive effects exist in the higher-order.

Table 5.7 contains the test for the hypothesis that K- and higher-order effects for the variables of Education Intentions, Quality of Institutions, Sex, Arts/Science Stream, Father's Occupation, Parents' Education and Ability are zero. For K = 3, this is the goodness-of-fit test for a model without third- and higher-order effects. The observed significant level of the third- and higher-order terms (Probability in the Table) are large (ranging from 0.9924 to 1), the hypothesis that the third- and higher-order interactions are zero should not be rejected. This means that there are no interactions among the variables on third- and higher-order terms. It appears that only the first (the grand mean) and the second-order effects are adequate to explain the data.

Table 5.7
Tests that K-way and higher order effects are zero

K	DF	L.R. Chi-sq	Prob	Pearson Chi-sq	Prob	Iteration
7	740	1.553	1.0000	.821	1.0000	3
6	187	9.874	1.0000	5.786	1.0000	9
5	183	139.844	.9924	133.437	.9977	20
4	639	532.034	.9992	812.114	.0000	15
3	1061	874.567	1.0000	1036.073	.7023	13
2	1281	2997.004	.0000	5743.604	.0000	2
1	1295	4350.273	.0000	8362.363	.0000	0

In order to reveal the individual terms of the interactive effects of the variables, the Backward Elimination method is applied. Table 5.8 contains the final model which indicates that no more effects are removed from the model since the observed significant level of the variables interaction are all smaller than 0.05.

Table 5.8
The interactive effects of the variables

MODELS WITH INTERACTIVE EFFECTS	Degree of freedom[63]	Likelihood Ratio Chi-square Change	Prob
1) ABCD	4	9.805	.0438
2) BCFG	4	20.755	.0004
3) CDE	5	14.936	.0106
4) CDF	1	9.651	.0019
5) AE	75	192.284	.0000
6) AF	4	28.277	.0000
7) AG	2	15.082	.0005
8) EF	10	23.117	.0103
9) BE	81	561.317	.0000

A = Education intentions
B = Quality of institution
C = Sex
D = Arts/Science streaming
E = Ability
F = Parents' education
G = Father's occupation

The results in Table 5.8 indicate that among the 9 groups of variables, only group 1, 5, 6 and 7 are related with the intention to seek higher education (the observed significant level of the likelihood ratio chi-square are smaller than 0.05)[64]. At the fourth-order

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[63]. The degrees of freedom are obtained by counting the number of categories and subtracting the number of estimated parameters.

[64]. The results of group 2,3,4,8 and 9 are not related directly with the present study. However, it would be revealing, if time allows, to examine the influence of sex, parent's education and father's occupation on the kind of schools the students are attending (group 2) or the effects of sex and ability on the choice of Science/Art subjects (group 3)

level (4 variables), the demand for higher education is related to the quality of institution students are attending; whether the students are male or female or whether they are studying Science or Arts subjects in Form V. At the second-order level, the intention for higher education is related to students' achievement in the HKCE, their parent's education level and whether their fathers are in manual or non-manual jobs.

The following analysis will focus on group 7, 6 and 1 (in this order). The relation between intention for higher education and ability (group 5) will be studied separately in Chapter 5.3.

5.21 Father's occupation

The father's occupations are divided into six categories which are grouped under non-manual and manual jobs. They are :

NON-MANUAL	MANUAL
professional	skill manual
managerial and	semi-skill manual and
skill non-manual	un-skill manual

---

or the relation between parents' education with the students' HKCE results (group 8).

Table 5.9 shows that although a similar percentage of students coming from different socioeconomic background opted for post-secondary education, students whose fathers hold manual jobs opt more for work after Form V than those from non-manual job backgrounds (29.5% against 13.3%). Hence the intention for further studies after Form V for students who come from manual job family backgrounds is lower than those from non-manual job ones. On the other hand, students who are from non-manual family backgrounds have a higher intention for university education than those from manual ones (35.2% against 20.1%). The Likelihood Ratio Chi-square is 65.13 and is significant at 0.0001 which simply reconfirms the fact the there are interactive effects between the variables.

Table 5.9
Students' education intentions according to father's occupation

EDUCATION INTENTIONS	FATHER'S OCCUPATION	
	Manual job No (%)	Non-Manual job No (%)
Work	323 (29.5)	59 (13.3)
Post-sec	552 (50.4)	228 (51.5)
University	220 (20.1)	156 (35.2)
L. R. Chi-square = 65.13 p < 0.0001		
Pearson Chi-Square = 62.82 P < 0.0001		

Table 5.10 is the results of the estimated parameters produced by the log-linear models. While there are distinct main effects of the variable of Higher Education and Father's Occupation, the interactive effects are shown by the coefficient under the joint variables of Higher Education and Father's Job. If the father's low occupation status has a direct effect on the child's decision to work after Form V, the number of cases in the manual job and intention to work cell would be larger than the number expected based only on the frequency of manual job and the frequency of intention to work. This excess would be represented by a positive value for the interactive variables (Higher Ed x Father's Job). On the contrary, if father's low occupation status does not affect the intention to work, the value for the interaction parameter would be negative. Table 5.10 shows that the coefficient of the interaction is .360151 (item 1) and is significant at 5% level. This shows that the father's manual job is a significant reason for the child's intention to work after Form V. However, there is no direct influence of father's low work status on the child's intention to enter post-secondary education and university education.

Table 5.10
Interactive effects of intention for education and father's occupation

	PARAMETERS Higher Education+	Fathers Job#	COEFFICIENT Higher Ed	Father's job	Higher Ed x Father's Job
1)	1	1	- .40584	+ .48835	+ .36015*
2)	2	1	+ .52930	+ .48835	- .04326
3)	3	1	- .12346	+ .48835	- .03168
4)	1	2	- .40584	- .48835	- .36015*
5)	2	2	+ .52930	- .48835	+ .04326
6)	3	2	- .12346	- .48835	+ .03168

+ value of higher education
1 = work
2 = post-secondary education
3 = university education
# value of father's job
1 = manual work
2 = non-manual work
* significant at 5% level

On the other hand, although it does affect the child's intention to study, the father's non-manual job is not a reason for the child's intention to work after Form V (item 4).

5.22 Parents' education

The parents' education (refer to Chapter 4.23, for the definition) which is the combined results of father and mother's education is divided largely into:

primary,
secondary and
post-secondary education

Table 5.11 gives the crosstabulation of the students' careers intentions according to their parents' education. From Table 5.11, the effects of the parents' education on students' careers intentions is apparent. Although there is not much difference in the pursuit of post-secondary education among the students whose parents have different education levels (the percentage of students are all close to 50%), students whose parents' education is at the primary level are more ready to settle in work after Form V (33.1%) and less prepared to seek university education (17.2%). The students whose parents had received secondary education are more inclined to seek post-secondary education (53.2%). In the other extreme, those whose parents have post-secondary education are less inclined to work after Form V (only 11.6%) and more willing to pursue university learning (39.5%). The Likelihood Ratio Chi-square is 90.68 and is significant at 0.0001 which simply confirms that interactive effects exist between the variables.

Table 5.11
Students' education intentions according to parents' education

EDUCATION INTENTIONS	PARENTS' EDUCATION		
	Primary No (%)	Secondary No (%)	Post-secondary No (%)
Work	269 (33.1)	103 (18.3)	25 (11.6)
Post-sec	404 (49.7)	300 (53.2)	105 (48.8)
University	140 (17.2)	161 (28.5)	85 (39.5)

L.R. Chi-square = 90.68 p < 0.0001
Pearson Chi-Square = 89.58 P < 0.0001

Table 5.12 is the results of the estimated parameters produced by the log-linear models. The coefficient for the interactive terms are .51491 and -.47241 for parameters 1,1 and 3,1 respectively (item 1 and 3) and are significant at 5% level. This shows that the parents' primary education level is the main reason for the children's intention to work after Form V but it does not contribute to the children's intention for university education.

Table 5.12
Interactive effects of intention for education and parents' education

	PARAMETERS Higher Education+	Parents' Education#	COEFFICIENT Higher Ed	Parents' Education	Higher Ed x Parents' Ed
1)	1	1	- .42799	+ .59453	+ .51491*
2)	2	1	+ .53239	+ .59453	- .04250
3)	3	1	- .10440	+ .59453	- .47241*
4)	1	2	- .42799	+ .22821	- .07501
5)	2	2	+ .53239	+ .22821	+ .02695
6)	3	2	- .10440	+ .22821	+ .04806
7)	1	3	- .42799	- .82274	- .43990*
8)	2	3	+ .53239	- .82274	+ .01555
9)	3	3	- .10440	- .82274	+ .42435*

+ value of Higher Education
1 = work
2 = post-secondary education
3 = university education
# value of Parents' Education
1 = largely primary level
2 = largely secondary level
3 = largely post-secondary level
* significant at 5% level

The parents' secondary education does not seem to exert any significant influence on the children's intention either for work or for study. On the other hand, the coefficient for parameters 1,3 and 3,3 (item 7 and 9) are -.43990 and .42435 respectively and are significant at .05 level. This indicates that the parents' post-secondary education is not a significant reason for the child's intention to work but it is a significant factor for the child's intention to pursue university education.

5.23 The quality of institutions, sex role and Art/Science Stream

In seeking further education students are primarily motivated by their previous educational experience. Other than the structure of curricula and courses, the separation of students in different schools according to ability is an important factor. When this factor is rigidly applied, they may constrain students' careers choices considerably.

In Hong Kong, as explained in Chapter 2, the differentiation of 'promising' students from the less able ones is carried out early in the educational system. One way to analyze the effect of institutions is by category, namely Government, Subsidized and Private schools. However, as argued in Chapter 2.31, when secondary education was expanded in the 1970s, it was inevitable that some of the Aided schools, particularly those in the new towns also received students from low ability banding. One useful way to account for the quality of institution is to use the ability of students as the proxy for the quality of institution (Johnson & Stafford, 1974).

A quality index for each school is thus created which is based on the average of the best five subjects of all the students of a school in HKCE:

	Low Quality	Middle Quality	High Quality
No of school	7[65]	11	4
Index range	1.00 - 2.38	2.86 - 3.72	4.19 - 4.75

Table 5.13 reveals that students from low quality institutions are more (44.5%) inclined to opt for work after Form V as compared with students from middle quality (17.3%) and high quality institutions (5.6%). More students from middle quality institutions (56.7%) opted for post-secondary education than their counterparts in low quality (45.6%) and high quality institutions (46.2%). On the contrary, more students (48.2%) from high quality institutions are ready to choose university education than middle quality (26.0%) and low quality institutions (10.3%). The impact of the quality of institutions on students' educational options is significant.

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[65] All the private schools are in Low Quality school and the four High Quality schools are all aided schools.

Table 5.13
Careers Intentions of students according to quality of institutions (in %)

CAREERS INTENTIONS	LOW QUALITY	MIDDLE QUALITY	HIGH QUALITY
Work	44.1	17.3	5.6
Post-sec	45.6	56.7	46.2
University	10.3	26.0	48.2
No of cases	614	700	301
Pearson chi-square = 281		p = 0.001	

On the other hand, sex role stereotyping could be a determinant of one's career choices. Girls are generally considered to be more 'linguistically' than 'mathematically' inclined and boys are considered 'better' at the science rather than arts subjects. This inclination may affect many careers opportunities.

Perhaps the reason why girl students are equally ambitious with boy students in the intention for higher education could be explained by Table 5.14. The table analyses boys and girls in the HKCE results according to Arts and Science streams. It shows in the Arts stream, the girls scored significantly better results than boys. Over 36.2% of the girl students obtained an average of grade D or above in the 5 best subjects in the HKCE. The

percentage for boy students was only 22.3. In the Science stream, the girls did equally well, if not better than boys in obtaining an average of grade D or above in the 5 best subjects in the HKCE (52.2% against 49%). In the other end of the scale, in both the Arts and Science streams, more boys than girls obtained the worst results. The Chi-square value is 302.09 and is significant at 0.0001 level.

Table 5.14
Students' HKCE results according to sex in Arts and Science subjects (in %)

HKCE RESULTS	ARTS STREAM		SCIENCE STREAM	
	Girls	Boys	Girls	Boys
	No (%)	No (%)	No (%)	No (%)
5 U	105 (16.4)	52 (27.1)	19 (6.4)	61 (14.1)
5 F	138 (21.6)	35 (18.2)	49 (16.3)	70 (16.1)
5 E	167 (26.1)	63 (32.8)	75 (25.1)	91 (20.7)
5 D	147 (23.0)	32 (16.7)	80 (27.1)	103 (23.7)
5 C	66 (10.3)	9 (4.7)	53 (18.0)	83 (19.1)
5 A/B	17 (2.7)	1 (0.5)	21 (7.1)	27 (6.2)
Pearson chi square = 302.09984 DF = 16 P = 0.0				

Table 5.15 studies the relation between the careers intentions and the students' sex, their choice of studies (Arts or Science stream) and the quality of institutions. In general, girls from institutions of high quality had a better results in the HKCE than their

counterparts from middle quality institutions and in turn, they are better than those from low quality institutions. As a consequence, the girls from institutions of high quality have a higher inclination to seek university education than their counterparts from middle quality institutions, in turn, they have higher intentions to seek higher education than their counterparts from low quality institutions. On the other hand, girls from lower quality institutions are more prepared to work after Form V than their counterparts in middle and high quality institutions.

Between boy and girl students, there is some difference in their intentions for university education. For all the three types of quality of schools, the girl Science students have a similar intention for university education as the boys counterparts and the girl Arts students in high quality institutions are higher in their intention for university education than the their boys counterparts. On the other hand, the Arts students were more inclined to opt for work than their Science counterparts.

Table 5.15
Education intentions by quality of institutions controlling for sex and streaming

EDUCATION INTENTIONS	QUALITY OF INSTITUTIONS					
	Girls			Boys		
	Low Quality	Middle Quality	High Quality	Low Quality	Middle Quality	High Quality
ARTS	No (%)	No (%)	No (%)	No (%)	No (%)	No (%)
Work	103 (41.5)	63 (21.2)	2 (1.8)	62 (55.9)	16 (28.6)	11 (26.8)
Post-sec	128 (51.6)	176 (59.3)	55 (48.7)	44 (39.6)	27 (48.2)	24 (58.5)
University	17 (6.9)	58 (19.5)	56 (49.6)	5 (4.5)	13 (23.2)	6 (14.6)
SCIENCE						
Work	31 (36.9)	22 (12.6)	1 (1.3)	74 (43.5)	22 (10.9)	3 (4.3)
Post-sec	44 (52.4)	80 (55.9)	34 (44.2)	64 (37.6)	113 (56.2)	26 (37.1)
University	9 (10.7)	45 (31.5)	42 (54.5)	32 (18.8)	66 (32.8)	41 (58.6)

When comparison is made between Arts and Science stream girls students who opted for university education, it is found that while those study in Arts stream do not differ much in the HKCE results with their counterparts from Science stream [Table 5.16 column (3) & (4) and column (5) & (6) where the observed significant value of chi-square are 0.3396 and 0.3364 respectively, both are bigger than 0.05] students from the Science stream are more ready to opt for university education than Arts students. This is particularly obvious in the middle and high quality institutions.

Table 5.16
A comparison of HKCE results between Arts & Science students who opted for university education in high, middle & low quality institutions

HKCE RESULTS	QUALITY OF INSTITUTIONS LOW (1) Arts	LOW (2) Science	MIDDLE (3) Arts	MIDDLE (4) Science	HIGH (5) Arts	HIGH (6) Science
GIRLS	No (%)	No (%)	No (%)	No (%)	No (%)	No (%)
5 U	6 (37.5)	2 (22.2)	1 (1.7)	0 (0.0)	0 (0.0)	0 (0.0)
5 F	3 (18.8)	2 (22.2)	6 (10.3)	2 (4.5)	0 (0.0)	0 (0.0)
5 E	0 (0.0)	2 (22.2)	19 (32.8)	14 (31.8)	10 (17.9)	3 (7.1)
5 D	6 (37.5)	3 (33.3)	19 (32.8)	16 (36.4)	15 (26.8)	9 (21.4)
5 C	6 (37.5)	0 (0.0)	11 (19.0)	6 (13.6)	19 (33.9)	19 (45.2)
5 A/B	1 (6.3)	0 (0.0)	2 (3.4)	6 (13.6)	12 (21.4)	11 (26.2)
Total	16	9	58	44	56	42
	chi-square = 4.6006 P = 0.3308		chi-square = 5.6705 P = 0.3396		chi-square = 3.3817 P = 0.3364	

HKCE RESULTS	QUALITY OF INSTITUTIONS LOW (7) Arts	LOW (8) Science	MIDDLE (9) Arts	MIDDLE (10) Science	HIGH (11) Arts	HIGH (12) Science
BOYS	No (%)	No (%)	No (%)	No (%)	No (%)	No (%)
5 U	1 (25.0)	3 (10.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
5 F	0 (0.0)	4 (13.3)	1 (7.7)	3 (4.5)	0 (0.0)	0 (0.0)
5 E	1 (25.0)	9 (30.0)	8 (61.5)	13 (19.7)	3 (50.0)	1 (2.5)
5 D	1 (25.0)	6 (20.0)	2 (15.4)	25 (37.8)	2 (33.3)	10 (25.0)
5 C	1 (25.0)	7 (23.3)	2 (15.4)	19 (28.8)	1 (16.7)	18 (45.0)
5 A/B	0 (0.0)	1 (3.3)	0 (0.0)	6 (9.1)	0 (00.0)	11 (27.5)
Total	4	30	13	66	6	40
	chi-square = 1.4187 P = 0.9223		chi-square = 5.6705 P = 0.3396		chi-square = 11.7829 P = 0.0082	

The pattern for boys are largely similar to that of the girls. However there are two exceptions. Among those

who opt for university education, there is not much difference between students of Arts and Science stream in their HKCE results in middle and low quality institutions. But this is not the case in the high quality institutions. In the latter the students in Science stream achieve significantly better results in HKCE than Arts students [Table 5.16 column (11) & (12) where the observed significant value of chi-square is 11.7829, smaller than 0.05]. Another exception is that boys who follow Arts stream from the high quality institutions have an low intention for university education, lower than their counterparts from middle quality institutions (refer to Table 5.15 where only 14.6% students who followed Arts stream in high quality institution opted for university education as compared with 23.2% Arts students from middle quality institutions who intended to follow the same educational goal). A closer examination of the result of these two groups of students [Table 5.16, column (9) & (11)] reveals that the male Arts students who prefer to advance to university education in high quality institutions are similar in their HKCE results to those in the middle quality institutions. On the other hand, as compared with other high quality institutions, the boys Arts students have an unusually large number (26.8% as compared with 1.8% from girls Arts students, 4.3%

from boys Science students and 1.3% from girls Science students in Table 5.15) prefer to work after Form V.

The phenomenon of lower intention for university education and high intention for work after Form V among male Arts students of high quality institutions may be due to fact that in Hong Kong owing to a number of factors, (e.g. the emphasis on narrow range of academic subjects) boys are often made to believe that they are better in science subjects. Consequently those who do not choose science subjects are regarded as less capable academically. This situation may be particularly severe in the high quality institutions. Boys in the Arts stream in high quality schools may have developed certain complex. The fact that among those who opted for university education, they are the only group which differ significantly in the HKCE with the Science students may be a confirmation of this complex. If this is the case, it is perhaps not surprising if their intention for higher education is thus affected.

5.3 Students' Awareness of Their Abilities and Their Careers Intentions

As explained in Chapter 2, in Hong Kong, the continuation of higher education after Form V is constrained by one's credentials gained in the HKCE. Despite this constraint, the demand for higher education has been very keen. In the present study, there are as many as 74.3% (1206 out of 1621) of the students who wanted to carry on with their studies. Do all of them possess the right 'ability' to go on? To what extent are students capable of choosing their future careers according to their abilities?

The Signalling view argues that because of the hiring requirements, it would be in the interest of the high ability students to invest more in education in order to signal to the potential employers their capability. In order to do so, it is necessary that the students are aware of their ability and act accordingly. On the contrary, it would not be in the interest of the low ability students to invest in education if the cost (both psychic and direct) of investment is high. Are students aware of their ability and act accordingly as predicted by the signalling arguments? The data of the present study offer a simple test of the relationship between higher ability and the intention for higher

learning - whether the declared intentions for higher education are backed up by the required achieved grades.

In a situation like Hong Kong where the demand for higher education has been so excessive, it is possible that a large number of students who desire higher education would not have the necessary required standards and because of this it is simply impossible to distinguish on ability ground those who prefer university education from those who prefer post-secondary education. The fact that the students who chose further studies came from a wide range of abilities is shown in Table 5.17. However the situation is not we anticipated. Over half of those who wanted to advance to post-secondary education (59.5%) and about one third of those who wanted to continue to university education (30.7%) scored poorly in the HKCE (5 Grade Es or below). Despite this, as a whole those who preferred to continue studying achieved significantly better results in the HKCE than those who chose working after Form V. There are 40.4% and 69.3% of those who intended to pursue education up to post-secondary and university levels respectively achieved grade D or above in 5 subjects in the HKCE and therefore satisfy the necessary minimum qualification for further studies. The

corresponding figure for the working group is only 12.6%. When a comparison of the students' attainment is made between those who opted for post-secondary and university education, those who preferred to study up to university education achieved much better results in the HKCE than those who preferred only post-secondary education. At Grade D, the difference between the two groups of students is 29.5% against 26.1% in favour of the university intenders; at Grade C, the difference is 26.9% against 12.5% and at Grade A and B, the difference is 12.9% against 2.0%.

Table 5.17
Students' education intentions and their best five subjects in HKCE

HKCE RESULTS	Education INTENTIONS		
	Work	Post-secondary	University
5 U	144 (38.1)	80 (10.1)	13 (3.4)
5 F	113 (29.9)	154 (19.4)	23 (5.9)
5 E	74 (19.8)	238 (30.0)	83 (21.4)
5 D	39 (10.6)	207 (26.1)	114 (29.5)
5 C	5 (1.6)	99 (12.5)	104 (26.9)
5 A/B	0 (0.0)	16 (2.0)	50 (12.9)

Likelihood ratio chi square = 481.12 DF = 10 P = 0.0
Pearson chi square = 479.54 DF = 10 P = 0.0

The observed significant level associated with the Likelihood Ratio Chi-square and the Pearson Chi-square is smaller than 0.0001 which rejects the model is

independent.

Table 5.18 illustrates the interactive terms of the two variables. For the lowest ability (5 U) to the low ability students (5E) (item 1 to 9), their low ability is the main cause of their intention for work after Form V (the coefficient of the lowest and low ability students who chose to work after Form V are +1.7665, +1.1964 and +0.3413 for items 1, 4 & 7 respectively, which indicate that their choices are a result of their low ability). At the same time, their low ability significantly affects negatively their intentions for university education (the coefficient of the lowest and low ability students who chose to go on for university education are -1.4435, -1.2006 & -0.3490 for items 3, 6 & 9 respectively, which show that their choice of studies was not caused by their ability).

Table 5.18
Interactive effects of the intentions for education and ability

	PARAMETERS		COEFFICIENT		
	Higher Education+	Ability#	Higher Ed	Ability	Highed Ed x Ability
1)	1	1	- 0.7690	+ 0.1064	+ 1.7665*
2)	2	1	+ 0.7328	+ 0.1064	- 0.3230*
3)	3	1	+ 0.0362	+ 0.1064	- 1.4435*
4)	1	2	- 0.7690	+ 0.4341	+ 1.1964*
5)	2	2	+ 0.7328	+ 0.4341	+ 0.0042
6)	3	2	+ 0.0362	+ 0.4341	- 1.2006*
7)	1	3	- 0.7690	+ 0.8659	+ 0.3413*
8)	2	3	+ 0.7328	+ 0.8659	+ 0.0077
9)	3	3	+ 0.0362	+ 0.8659	- 0.3490*
10)	1	4	- 0.7690	+ 0.7116	- 0.1450
11)	2	4	+ 0.7328	+ 0.7116	+ 0.0224
12)	3	4	+ 0.0362	+ 0.7116	+ 0.1225
13)	1	5	- 0.7690	- 0.2495	- 1.2379*
14)	2	5	+ 0.7328	- 0.2495	+ 0.2460
15)	3	5	+ 0.0362	- 0.2495	+ 0.9919*
16)	1	6	- 0.7690	- 1.8685	- 1.9214*
17)	2	6	+ 0.7328	- 1.8685	+ 0.0427*
18)	3	6	+ 0.0362	- 1.8685	+ 1.8787*

+ value of Higher Education
1 = work
2 = post-secondary education
3 = university education
# value of Ability
# 1 = Average of 5 U of the best 5 subjects in HKCE
2 = Average of 5 F of the best 5 subjects in HKCE
3 = Average of 5 E of the best 5 subjects in HKCE
4 = Average of 5 D of the best 5 subjects in HKCE
5 = Average of 5 C of the best 5 subjects in HKCE
6 = Average of 5 A/B of the best 5 subjects in HKCE
* Significant at 5 % level

On the contrary, for the able students (items 13 to 18), their high ability is not the cause for the intention for work after Form V (the coefficients for items 10, 13

& 16 are -0.1450, -1.2379 & -1.9216 respectively), but the demand for higher education is clearly the result of their high ability (the coefficients for items 12, 15 & 18 are 0.1225, 0.9919 & 1.8787 respectively).

From the results, it seems clear that at the lowest ability level, the choice for work after Form V is the outcome of low ability, though the number is small (only 12.6%). In the early analysis (Table 5.4), 55.9% of this group of students realized that they were poor in their school work. On the other hand, although over half of those who intended to continue to study scored rather poorly in HKCE, those who chose university education are much better in HKCE results than those who chose post-secondary education. One can therefore conclude that there is a marked difference in ability in students' education intention.

5.31 Two further indications of the association between ability and careers intentions

A further breakdown of those students who opted for study reveals that their supplementary choice of study is ability-related.

In the questionnaire, the students were asked what they would do after Form V. The students were given a choice from working to various forms of education as follows:

working
repeat Form V
enter two-year Form VI,
enter one-year Form VI,
enter Polytechnics,
enter Technical Institutes (day-time courses) and
enter College of Education

Other than the students who selected working, the remaining 1206 chose various forms of full time education. There are different academic requirements in these studies. If the choice is ability-related, this should be reflected in their preference for courses of studies. Most higher institutions like the University of Hong Kong, the Baptist College and a large number of courses in the Polytechnics accept students at the end of Form VII, the two-year Form VI which requires a

higher academic qualification (ref to Chapter 2 for more information) are believed to attract the most students, followed by the one-year Form VI which is geared towards the Chinese University alone and the certificate courses of the Polytechnics. The Colleges of Education and the Technical Institutes are usually the students' last choice and the requirements are usually not high. Those who intended to repeat again must be quite weak academically.

Table 5.19 clearly indicates that this is exactly how students in Hong Kong made their careers choice. There is an apparent 'hierarchy' of preference for different courses of study after Form V which is associated with one's ability. As shown in Table 5.19, the students who chose working after Form V scored the poorest in the HKCE. Among them only 11.8% (44 students) achieved an average of D grade or above in the 5 best subjects, the majority 88.2% (331 students) got an average of E or below E grade. For those who wanted to go on with their studies: of the 240 who desired to repeat Form V the following year, 82.5% (199 students) scored an average of E or below E grade in the 5 best subjects; of the 145 who wanted to enter Technical Institutes probably for some craft courses, 77.9% (113 students) scored equally poorly in HKCE; of the 38 who

planned to enter Colleges of Education, 55.2% (21 students) achieved an average of D grade or above in the 5 best subjects; of the 79 and 176 who intended to enter the HK Polytechnic and the one-year High Level Form VI, a similar percentage of students, 58.2% (46 students) and 58.5% (103 students) respectively scored an average of D grade or above in the 5 best subjects. Those who were prepared to enter the two-year Advanced Level course had the largest number of students (461) and the highest percentage (73.5%) in obtaining an average of D grade or above in 5 best subjects. The Pearson Chi-square value is 448.238 and is significant at 0.0001 level.

Table 5.19
A breakdown of students' careers intentions after Form V according to the HKCE results (in %)

HKCE RESULTS	WORK	STUDY					
		Repeat F. 5	Tech Insti	College of Ed	HK Poly-tech	CU FORM VI	HKU FORM VI
5 D or above[66]	11.8	17.5	22.1	55.3	58.2	58.5	73.5
5 E or below[67]	88.2	82.5	77.9	44.7	42.5	42.4	26.5
Pearson chi square = 448.23094 DF = 8 P < 0.0001							

[66] An average of grade D or above in the 5 best subjects in Certificate of Education.

[67] An average of grade E or below in the 5 best subjects in Certificate of Education.

Another evidence can be traced by further looking at those who opted for post-secondary and university education. Again, it is to test whether the choice of higher institutions between who opted for post-secondary and university education is also ability-related.

In the questionnaire, those who preferred higher studies were asked to indicate the highest qualification they intended to achieve and the institutions they would choose for their studies. First, there should be a match between the choice of the highest qualification and the kind of institutions which offer the courses leading to the intended qualifications. Table 5.20 reflects quite a large number of the students (over 50%) who had indicated their highest intention for education was post-secondary in fact chose HKU or CUHK as their preferred institutions for studies. On the contrary, those who opted for university education are remarkably consistent in their choice of higher institutions. Over 86% of them chose local universities as their higher institutions. A further 11.6% chose overseas universities making a total of 97% clear university 'intenders'. A study of the confidence level of the students in their education intentions also confirms

that the students who opted for post-secondary education were the least confident of their choice as compared with those who chose working after Form V and those who preferred university education (73.3% against 50.5% and 57.1% respectively).

Table 5.20
The students' intentions for further education and their choice of higher institutions (in %)

HIGHER INSTITUTIONS	FURTHER EDUCATION INTENTIONS	
	Post-secondary	University
HKU	32.9	50.4
CUHK	22.4	25.2
HK Polytechnic	22.4	10.8
College of Ed	6.2	0.0
Baptist College	3.6	1.0
City Polytech	2.6	.8
Shu Yan College	.4	.3
Ling Nam College	.4	0.0
Overseas Uni	9.1	11.6
No of cases	780	389

Table 5.21
Confidence of Students in Careers Intentions (in %)

CONFIDENCE LEVEL	CAREERS INTENTIONS		
	Work	Post-sec	University
Very Sure	10.7	4.7	4.7
Sure	38.8	22.6	38.2
Not Sure	50.5	73.3	57.1
No of Cases	402	808	385

Chi-Square = 79.33 P < 0.0000

Second, if the choice is ability-related, it should be borne out in students' preference. The University of Hong Kong, being the most prestigious university with the highest standing is believed to attract the most students, followed by the Chinese University of Hong Kong and the Polytechnic. The Baptist College has a history as long as the Chinese University of Hong Kong but is only recently elevated to a new status and could confer degrees in some departments. The new status should make it attractive to students. Ling Nam College is a newly recognized post-secondary college and Shue Yan is a private institution and both offer four-year courses after Form V. It is believed that they are the least preferred institutions.

Table 5.22
A breakdown of students' further education intentions after Form V according to the HKCE results (in %)

	ALL (post-sec + university)								
HKCE RESULTS	HKU	CU	HK POLY	OVERSEAS UNI	BAPTIST COLLEGE	COLLEGE OF ED	CITY POLY	SHUE YAN COLLEGE	LING NAM COLLEGE
D or above	60.7	53.6	37.6	39.8	53.3	38.3	36.4	25.0	0.0
E or below	39.3	46.4	62.4	60.2	46.7	61.7	63.6	75.0	100.0
lo of cases	448	267	213	113	30	47	22	4	3
	Pearson chi square = 47.83525 DF = 8 P = .000								

Table 5.22 indicates the University of Hong Kong indeed attracts the most students with the highest abilities, followed by the Chinese University of Hong Kong. The third position goes to Hong Kong Polytechnic in terms of the number of students but not ability. Baptist College comes 4th with regard to applicants' ability but in terms of the number of students, it is the 6th. The two Polytechnics and the Colleges of Education draw students from a similar ability range. Over 20% of the students indicated that they would prefer overseas university education. It reveals a rather true picture of Hong Kong students for overseas studies and the ability range of this group of students are similar to those of the Polytechnics. The Shue Yan and Ling Nam Colleges are the least preferred by students both in number and ability. The observed significant level associated with Pearson Chi-square is smaller than 0.0001.

The evidences so far point to the fact that i) students are aware of their ability and ii) not only the education intentions of the students in Hong Kong are ability-related, their choice of courses for further education and the higher institutions are also related to ability.

5.4 Summary

This chapter has established that students' motives for higher education are related to economic considerations. This is more so in boys than girls. Conversely, more girls than boys subscribe to the consumption view of education although for girls also economic motives are dominant.

In the demand for higher education, the variables like quality of schools, sex, streaming, ability, parents' education and father's job all have their share of influence. The log-linear models reveal that among all these variables, the quality of schools, sex and streaming are inter-related in their influence on the demand for higher education and it is able to establish also that the intention for entering higher education is a result of the father's job status and high level of education. Perhaps it is due to the fact that encouragement and aspirations are abundant and forthcoming in these families. On the contrary, students from working class and with low education parents have a higher tendency to leave schooling after Form V.

The last part of the Chapter shows that the demand

for higher education is indeed closely related to the ability of the students. Not only are students who intended to leave school after Form V the ones with the lowest ability, those who preferred to proceed up to only post-secondary education are less academically capable than those who intended to enter university education. This ability-related choice is not confined to the demand for higher education along but is reflected in the choice of types of studies as well as the higher institutions.

It seems reasonable to conclude that Hong Kong students are economically motivated for higher learning. In the demand for higher education, the influence of family background, ability of students, sex role, streaming and quality of schools are substantial. Moreover, students are aware of their ability and those capable are more ready to invest in more education than those who are less capable and in turn they are more ready to invest in education than those who are least capable.

CHAPTER 6 REGRESSION ANALYSIS AND THE *EX ANTE* RATES OF RETURN

6.0 Introduction

This chapter examines the expected earnings of the students and the factors which affect these expectations. The first part of the chapter compares the expected monthly earnings of students of different careers intentions.

The next section analyzes the lifetime earnings of students according to their careers intentions, family background, ability and quality of schools. Some features of these general analysis are observed.

The third part of the chapter applies the regression analysis to examining the factors which affect the expected lifetime earnings of the students. The examination is further broken down into social class, ability and quality of schools. Their interaction is examined.

The fourth part of the chapter calculates the *ex ante* rates to higher education for boys and girls and students of different ability groupings, from different

quality of schools and home backgrounds.

The last part of the chapter compares students who intended to go abroad for their higher education with the local students and the perceived rates of return for overseas education.

6.1 The Actual and Expected Earnings

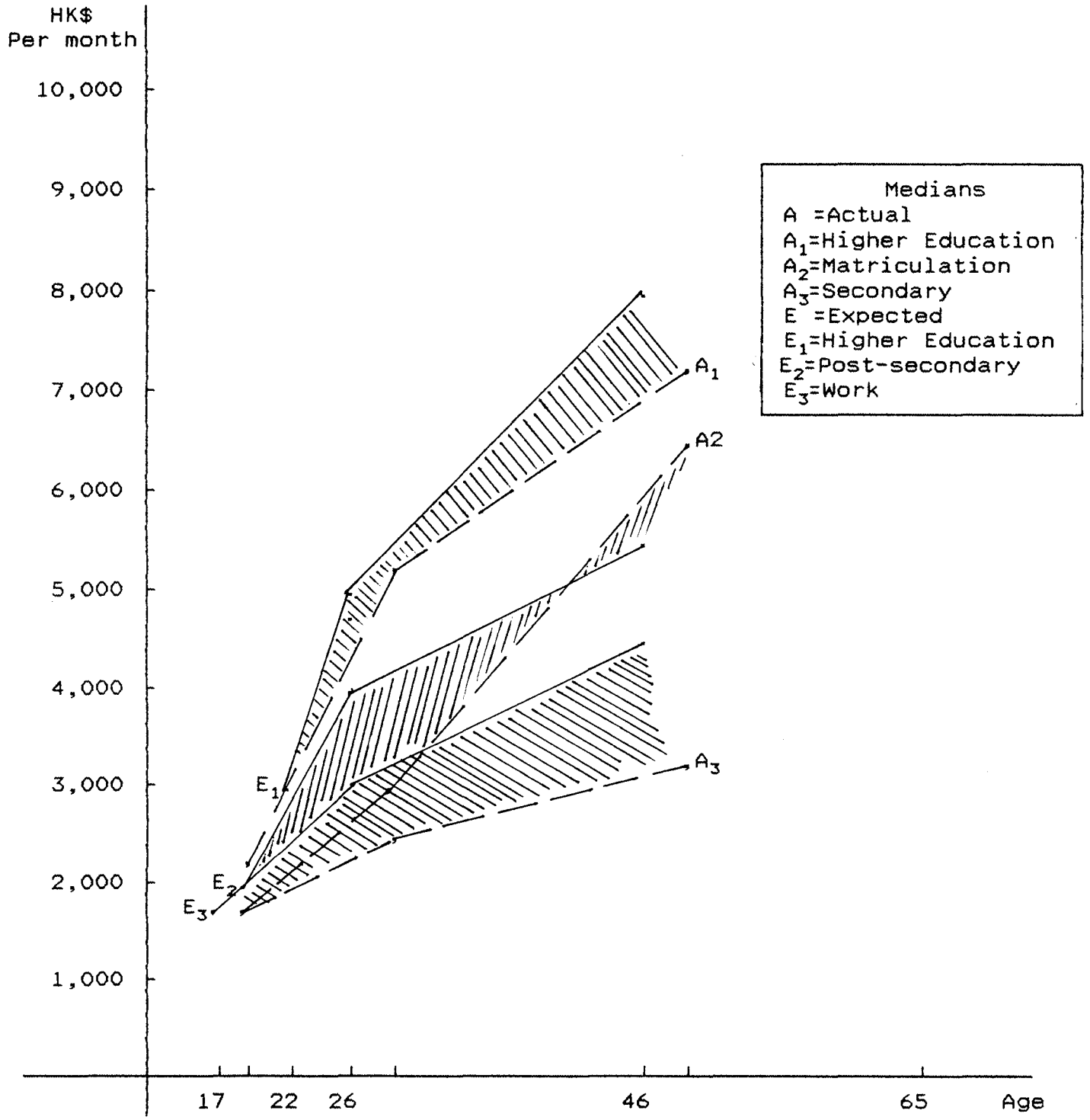
A crude expected age earnings and careers intentions profile is constructed based on the expected earnings in three different periods of the students lives: when they began work, at the age of 26 and at 46. Table 6.1 shows the median expected monthly earnings by intention. The findings are consistent with the findings by Williams and Gordon 1981) and Psacharopoulos and Sanyal (1981a) that those who continued with their education expected higher lifetime earnings and that boys expected higher earnings than girls.

Table 6.1
Median expected earnings (HK$ per month) of Hong Kong Form V students by education intentions

CAREERS INTENTIONS	HK$ PER MONTH AGE 17	19	22	26	46
ALL					
Work	1,800			3,000	4,500
Post-secondary		2,000		4,000	5,500
University			3,000	5,000	8,000
BOYS					
Work	2,000			3,500	5,000
Post-secondary		2,500		4,000	6,000
University			3,000	5,000	10,000
GIRLS					
Work	1,800			3,000	4,500
Post-secondary		2,000		4,000	5,000
University			3,000	5,000	8,000

Figure 6.1 compares the median perceptions of earnings by intention of students with actually observed age-earning profiles in the four combined quarter of 1985 General Household Survey conducted by the Census and Statistics Department. In general, the students in the three categories of intentions; for work, post-secondary and university education over-estimated their lifetime earnings. A breakdown of the case by sex, Figures 6.2 & 6.3 reveal a similar pattern. In a rapidly expanding economy such as Hong Kong, the students may be aware of the continuous rise of wages in the market. Under this influence, it is likely that they tend to over-estimate their expected earnings. Subjectively they

Fig 6.1 Actual and Expected Relative Age-earning Profile of Both Boys and Girls



Note: Due to the wide age interval in the General Household Survey, the actual lifetime earnings as represented by the dotted lines are on the high side.

Fig 6.2 Actual and Expected Relative Age-earning Profile of Boys

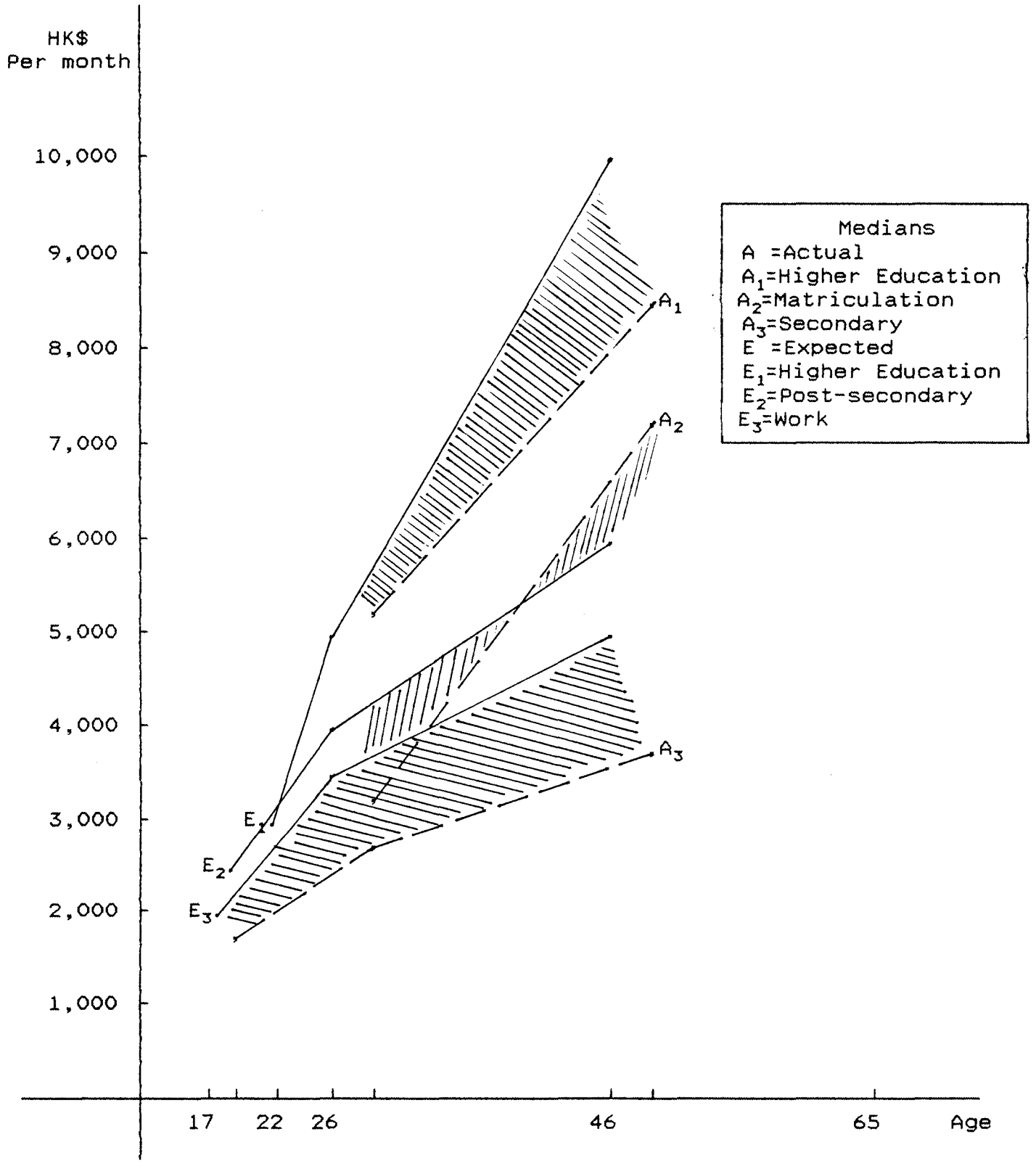
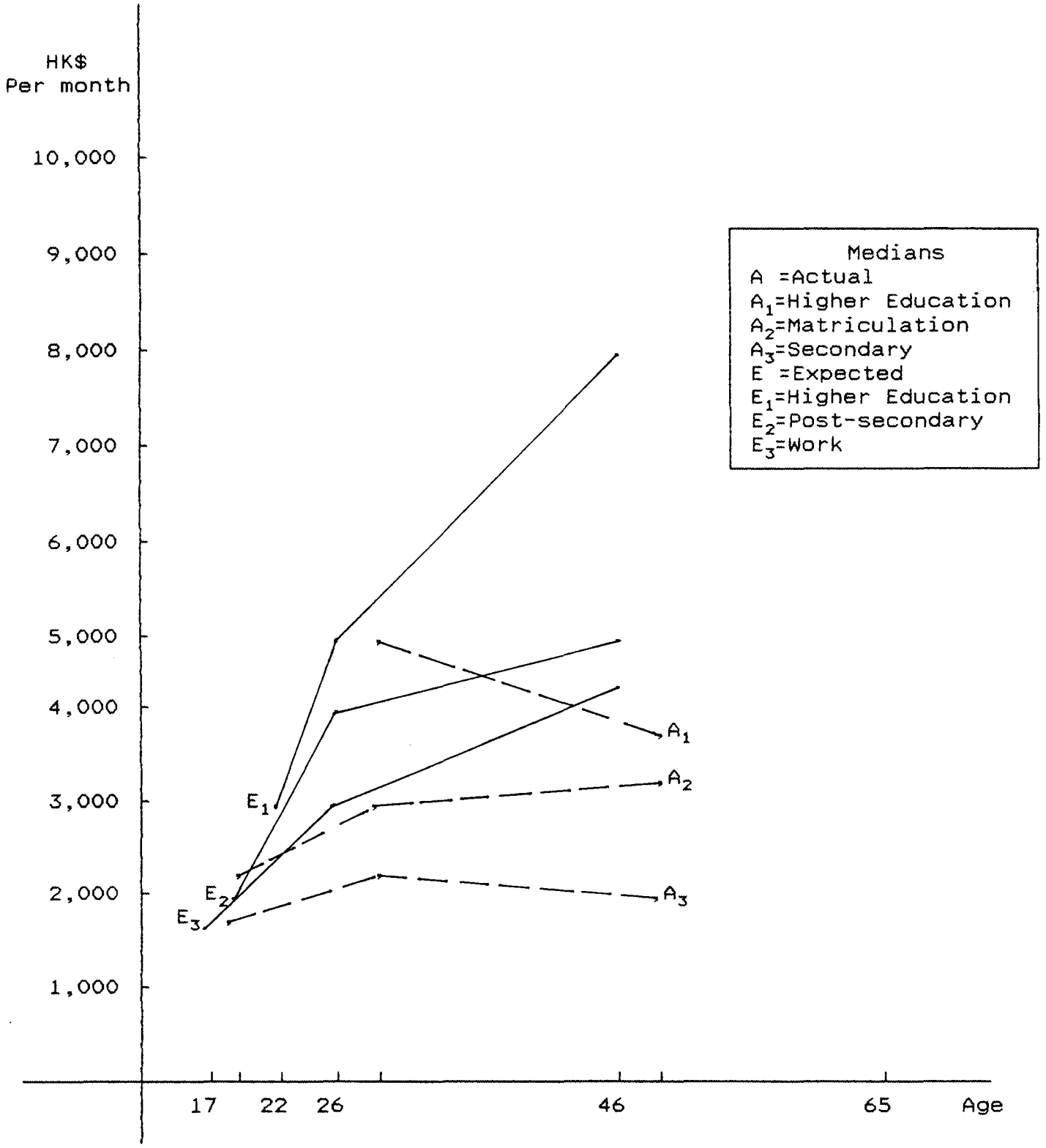


Fig 6.3 Actual and Expected Relative Age-earning Profile of girls



may wish to see a fast rise in their expected earnings in the course of time. It is also likely that many students may believe that because of higher level of schooling, they should expect a higher financial return. In this respect, even the students who intended to work after the summer of 1986 were potential secondary schools graduates, an educational level higher than those who completed only Form III.

For girls the situation is more complicated. In the actual labour market, the participation rate for women, particularly in the university education bracket, is low[68], which drastically reduced the lifetime earnings of women - a situation where the school girls were not fully aware of. This makes the margin between the actual and expected lifetime earnings for girls much larger than boys.

Taking the picture as a whole, one may argue that the young students in Hong Kong are not unrealistic in their assessment of the earning prospects associated

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[68]. The 1981 Census Main Report gives the female's participation rate for the age of 20-24, 25-34, 34-44 as 79.9%, 56.8% and 53.4% respectively.

with the educational path they wish to follow, though their expected monthly earnings are on the high side.

6.2 Influence of Home Environment, Cognitive Ability and Quality of schools on Lifetime Earnings

Table 6.2 presents the conceived expected lifetime earnings of students according to father's occupation, students' achievement in HKCE, 1986 and education intentions. As shown in Table 6.1, those who continued with further education expected higher earnings in the lifetime, and boys expected higher earnings than girls. The inclusion of the factors of father's occupation and students' cognitive ability discloses some interesting findings. While it is true that in general those who intended for higher education, those who are from White-collar families and those who have the highest ability expected a higher lifetime earnings than those who opted for lower level of education, those from blue-collar family and those who have the lower ability, there are a number of other revealing features:

(1) Within each category of father's occupation, students in the White-collar Family who obtained the best results in HKCE expected higher lifetime earnings than those who achieved average results and in turn they expected higher lifetime earnings than those who scored the worst results. The same situation prevails in the Worker Family.

(2) Between the categories of father's occupation:

a. Students in the groupings of Top, Average and Low abilities in the White-collar Family expected a higher lifetime earnings than their corresponding counterparts in the Worker Family.
b. Except the students who opted for university education, the Low Ability group in the White-collar Family expected higher lifetime earnings than the Top Ability students but were from the Worker Family. A breakdown of the figure into sex reveals that the exception still holds in boys but for girl students, the Low Ability group from White-collar Family all expected a higher lifetime earnings than the Top Ability students from the Worker Family.

Contrary to the findings by Williams and Gordon (1981, p201-203) which discovered that anticipated lifetime earnings are strongly associated with educational intention and ability but not with social class, the present findings discovered that the expected lifetime earnings are not only the results of students' ability and education intention, it is also the results of parental working experience (as measured by father's occupation). In some cases (e.g. the low ability students from white-collar family) social environment could exert even more influence on the expected lifetime earnings than ability. The different findings of the effect of social environment on anticipated lifetime earnings may, in a way, reflect the different social set up of the two societies. Perhaps it is too large a claim to argue, because of the subdued influence of family

background, England and Wales is a more egalitarian society than Hong Kong. Family background is certainly a factor to be reckoned with in Hong Kong other than the students' own ability and the amount of higher education undertaken. Family background still enhances or inhibits the propensity of students to earn higher incomes.

Table 6.2
Expected average lifetime earnings (mean) of students according to father's occupation, cognitive ability and careers intentions

CAREERS INTENTIONS	WHITE-COLLAR FAMILY Top Ability[69]	Middle Ability	Low Ability	WORKER FAMILY Top Ability	Middle Ability	Low Ability
			(,0000)			
ALL						
Work	/	302(16)	328(33)	303(4)	232(85)	232(198)
Post-sec	410(32)	362(129)	325(46)	309(72)	294(280)	265(165)
University	536(53)	511(82)	449(15)	497(90)	417(103)	413(16)
BOYS						
Work	/	319(7)	332(20)	364(2)	247(34)	243(84)
Post-sec	450(10)	375(37)	353(19)	348(35)	322(102)	292(60)
University	606(17)	516(27)	450(3)	575(44)	472(49)	458(8)
GIRLS						
Work	/	288(9)	322(13)	241(2)	222(51)	224(114)
Post-sec	392(22)	357(91)	305(27)	272(37)	279(178)	250(105)
University	503(36)	509(55)	444(12)	422(46)	369(54)	369(8)

Figure inside () indicates the number of cases

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[69]. Top ability = average 5 credits or above in 5 best subjects in HKCE.
Middle ability = average 5 grade D or E in 5 best subjects in HKCE.
Low ability = average 5 grade F or U in in 5 best subjects in HKCE.

Method of calculation:

Expected Lifetime Earnings = 0.5 * (26 - age of starting work) *
(expected starting earnings + expected earnings at 26) +
10 * (expected earnings at 26) + 29 * (expected earnings at 46)

or in symbol form ELE = $0.5(26 - A)(E_1 + E_2) + 10(E_2) + 29\ (E_3)$

Note : In this sample, the starting working age is the mean of the reported age which is 17 for working youth after F. 5, 19 for post-secondary and 22 for university education.

Table 6.3 displays the conceived expected lifetime earnings of students according to father's occupation, quality of schools and education intentions. Owing to the fact that quality of schools is based on the average ability of the students in the schools (refer to Chapter 4.22), Table 6.3 presents a different angle looking at the same issue. Within Table 6.3, there are similar features as described in point (1) to (2) above. Both the family background and school quality affect the educational intention of the students and the expectation of lifetime earnings is also the result of home influence.

Table 6.3
Expected average lifetime earnings (mean) of students according to father's occupation, quality of schools and education intentions

CAREERS INTENTIONS	WHITE-COLLAR FAMILY High School Quality	Middle School Quality	Low School Quality	WORKER FAMILY High School Quality	Middle School Quality	Low School Quality
			(,0000)			
ALL						
Work	227(2)	335(14)	318(33)	292(10)	225(95)	234(182)
Post-sec	411(46)	365(106)	312(55)	337(82)	284(257)	270(178)
University	555(55)	489(79)	492(16)	452(80)	469(91)	407(38)
BOYS						
Work	227(2)	355(7)	330(18)	292(8)	237(27)	245(85)
Post-sec	405(5)	401(39)	337(22)	333(40)	322(90)	303(67)
University	713(9)	506(30)	498(8)	504(32)	566(46)	431(23)
GIRLS						
Work	/	316(7)	304(15)	291(2)	221(68)	224(97)
Post-sec	412(41)	345(66)	295(33)	335(42)	264(167)	245(111)
University	524(46)	478(49)	486(8)	418(48)	371(45)	369(15)

Figure inside () indicates the number of cases

When comparison is made between Table 6.2 and 6.3, it is found that in the High Quality Schools of the white-collar families (Table 6.3), in every level of careers intentions, girl students expected a higher lifetime earnings than their counterparts of the same careers intentions who were grouped under Top Ability (Table 6.2), but in the worker families, the boy students expected a lower lifetime earnings than their counterparts of the same careers intentions grouped under Top Ability. In the Middle and Low Quality Schools, the situation is mixed. This seems to suggest that in the High Quality Schools of the white-collar

families, the expected lifetime earnings of girl students were subjected more to the influence of schools while in the High Quality Schools of the worker families, the expected lifetime earnings of boy students were subjected more to the influence of their individual ability.

6.3 Earnings Functions and The Regression Analysis

In order to understand the interaction between perceived lifetime earnings, the variable on education intentions and other variables, an earning function of a the following form is suggested (see Chapter 4.23 for the explanation of the variables):

$$\text{Ln ELE} = a + \beta_1 UE + \beta_2 LS + \beta_3 FB + \beta_4 S + \beta_5 QI + \beta_6 CA + \beta_7 A/S + \beta_8 PE1 + \beta_9 PE2 + \beta_{10} AR + \beta_{11} DG$$

where
- Ln ELE = Estimated log lifetime earnings
- UE = Intention to enter university education
- LS = Intention to leave school after F.5
- FB = Family background
- S = Sex
- QI = Quality of schools
- CA = Cognitive ability
- A/S = Science or Arts stream
- PE1 PE2 = Parents' education
- AR = Attitude to risk in employment
- DG = Propensity to defer gratification

The earning functions are estimated by the least squares regression using the SPSSPC+ package. Effort is made to have a good fit of the regression. Williams and Gordon (1981) suggested five types of relevant information to be extracted from the regression equations. These include:

1. The average amount of extra lifetime income expected as a result of undertaking post-secondary and university education - the B coefficients.

2. The relative importance of the different variables in explaining the expected lifetime earnings - the ß (Beta) coefficients.

3. An estimate of the proportion of expected extra income associated with post-secondary or university education which can be attributed to the extra intended education - the α (Alpha) coefficient.

4. An estimate of the success of the postulated earning function in explaining anticipated lifetime earning differences - R^2 the correlation coefficient.

5. A comparison of the differences between social class and ability groups in the impact of each of the variables considered on the expected lifetime earnings.

Table 6.4 gives the mean and standard deviation of all the variables. The dependent variable of Lifetime earnings is in natural log. The variability of the variables, judging from the Standard Deviation seems to be quite normal.

Table 6.4
Means and Standard Deviation
of the variables in the regression

VARIABLES		Mean	Std Dev	Cases
Ln ELE	(Estimated log lifetime earning)	14.931	.461	1536
UE	(University education)	.323	.468	1206
LS	(Leaving School)	.249	.433	1621
FB	(Father's occupation)	.287	.452	1546
S	(Sex)	.403	.490	1620
A/S	(Arts/Science Stream)	.462	.498	1621
PE1	(Parents' education)	.504	.500	1621
PE2	(Parents' education)	.349	.476	1621
QI	(Quality of institution)	1.805	.728	1621
CA	(Cognitive ability)	3.138	1.387	1565
AR	(Attitude to risk)	3.917	1.842	1605
DG	(Deferment to gratification)	4.438	1.719	1607

Table 6.5 shows the correlation of the dependent and the independent variables. All the independent variables are significantly correlated with the Estimated Log Lifetime Earnings (Ln ELE). However, among them, the intention to enter University Education (UE), the intention to Leave School (LS), Quality of Institution (QI) and Cognitive Ability (CA) have a higher correlations with the Estimated Log Lifetime Earnings (Ln ELE). On the other hand, the variables of Parents' Education 2 (PE2) and the Deferment of Gratification are least correlated with

Ln ELE. This will be reflected in the regression analysis.

Table 6.5
Zero-order correlation matric for the entire sample (N=1465)

	Ln ELE	UE	LS	FB	S	A/S	PE1	PE2	QI	CA	AR	DG
Ln ELE	1.0000											
UE	.4340**	1.0000										
LS	-.3303**	.0000+	1.0000									
FB	.2972**	.1219**	-.1673**	1.0000								
S	.1378**	.0504	.0683*	-.0753*	1.0000							
A/S	.1665**	.1487**	-.1126**	.0429	.3574**	1.0000						
PE1	-.2064**	-.1280**	.1849**	-.4057**	.0986**	-.0025	1.0000					
PE2	.0676*	.0435	-.1148**	.1393**	-.0715*	-.0386	-.7384**	1.0000				
QI	.3030**	.2491**	-.3391**	.1248**	-.0774*	.0607	-.1410**	.0764*	1.0000			
CA	.3376**	.3304**	-.4349**	.1248**	-.0137	.2025**	-.1096**	.0488	.6227**	1.0000		
AR	.2515**	.1319**	-.0954**	.0787*	.0960**	.0483	-.0486	-.0280	.0719*	.1183**	1.0000	
DG	.1005**	.0659	-.0909**	.0261	.0169	.0038	-.0278	.0113	.0250	.0678*	.2098**	1.0000

* significant at .01 ** significant at .001
\+ UE is part of LS, hence it has no correlated value with LS

Table 6.6 shows the results of the regression on log expected lifetime earnings for the whole sample and for boys and girls separately. In the whole sample, except the variables of Arts/Science stream and the attitude towards deferment to gratification, all the independent variables exert significant influence on the expected lifetime earnings, carry the expected signs and are predictors of the self expected lifetime earnings.

Since the dependent variable is in log unit, the coefficients give the percentage effect on earnings of a unit change in the explanatory variables. Looking at the

schooling effect alone, for the whole sample (Equation 2), those who intended to continue university education expected to earn 40.8% ($1,110,000) more than those who intended to finish post-secondary in lifetime and those who intended to leave school in turn expected to have 22.7% ($620,000) less than those who intended to continue post-secondary education after Form V. On average, boys expected 11.6% ($220,000) more than girls over their lifetime earnings after taking education and other differences into consideration (Equation 11). For boys the advantage of university education over post-secondary is 40.8% ($1,270,000) and higher studies over leaving school after Form V is 24.5% ($760,000) (Equation 13); for girls the advantages are 39.8% ($1,100,000) and 23% ($630,000) respectively (Equation 22). When other intervening variables which are also associated with the propensity to undertake post Form 5 education are taken into account, the additional expected earnings that can be attributed to university education falls to 30.4% ($580,000), followed by a similar fall to 14.1% ($270,000) in those expecting to continue post-secondary education (Equation 11). This corresponds to an overall alpha coefficient (α) of 0.52 for university and 0.43 for post-secondary education.

Psacharopoulos (1975) reviewed 16 case studies in

the actual or implied alpha coefficient and found the value of the coefficient varied from 0.40 to of 0.97 from secondary to higher education with the overall average value equal to 0.77. The findings by Williams and Gordon (1981) are 0.7 for higher education and 0.6 for post-compulsory education.

The 'perceived' alpha coefficient of 0.52 for university education in Hong Kong appears to be low. One feature of the model is the large claim of the willingness to take risky job on the expected earnings. The variable explains 2.18% of the variance of the model, larger than the effect of the quality of schools. It is not uncommon to include subjective perception variables to study their effects on earnings. However, the effects of these variables, like motivation and family background, are chiefly mediated through education (Duncan et al, 1972, Kiker & Condon, 1981). In the calculation of the alpha coefficient using cross-sectional data, the variables to account for the influence on the observed earnings, like IQ, family background, sex, race, rank in high school class, quality of institution..... etc are more directly earnings-related (Hinchliffe, 1987). If the willingness to take risk (Risk) and defer gratification (DG) are excluded from the calculation of the alpha coefficient

(to compare Equation 2 with Equation 9 instead of 11), the alpha coefficient is raised to 0.64 for university education and 0.53 for post-secondary studies. For boys it is raised from 0.61 and 0.47 to 0.75 and 0.61 for university and post-secondary education respectively (compare Equation 13 and 19) and for girls it is raised from 0.46 and 0.34 to 0.57 and 0.43 for university and post-secondary education respectively (compare Equation 22 and 28). Even with this adjustment, an overall alpha coefficient of 0.64 for university and 0.53 for post-secondary education appear to be low particularly when the higher education in Hong Kong is scarce than in UK and US, which should argue for a higher value of alpha coefficient. On the other hand, the restrictive character and selective effect of the education system of Hong Kong may suggest an influence of social background which would lower the value of the alpha coefficient of secondary education[70]. Indeed, the lifetime earnings estimated by secondary students should reflect more the restrictive characteristics of the education system than the limited supply of educated labour in the market. If this is true, the low alpha

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[70]. Blaug (1970) held that the restrictive character of British secondary education in the entry into universities suggests the selective effects of social-class determinants which argues for a lower alpha value of secondary education.

coefficients for university and post-secondary education are explained.

Table 6.6 reveals that many independent variables are significant at 5% or lower level and have bearings on the expected lifetime earnings[71]. Among them, father's occupation, sex and quality of schools have the largest claims.

Students who come from a white-collar family background expected 17.7% ($310,000) more than those whose fathers have blue-collar occupations after adjustment for education and other variables (Equation

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[71]. The independent variables are entered by Enter method of the SPSSPC Plus package which 'forces' every independent variable into the regression equation regardless of their value. If Stepwise method is used, where variables are examined at each step for entry, only six independent variables are selected. These include Intention to enter University Educational (UE), Intention to Leave School after Form 5 (LS), Father's Job (F), Sex (S), Quality of Institutions (QI), and Cognitive Ability (CA). The ß (Beta) value and R^2 are of these variables are as follows:

Variables ß (Beta)							
INTER-CEPT	UE	LS	F	S	QI	CA	R^2
14.47*	.324*	-.164*	.201*	.129*	.083*	.036*	.3676

* significant at 5% level

11). Students who study in high quality schools expect to earn 6.1% ($120,000) in their lifetime more than those who study in the middle quality schools, and in turn they expect the same amount more than those who study in low quality schools. In a similar manner, students who are in the high ability category expect to earn 2.1% ($40,000) more than those who are in the middle ability range, and in turn they expect the same amount more than those who are in the low ability group.

The total explanatory power of the models (R^2) in Table 6.6 is 35.22%, of which the intention to go on for university education explains 22.21% when other variables are controlled. The influence of family background seems to be strong on the expected lifetime earnings. The is particularly so in girls which has increased the explanatory power of the models 6.53%. The influence of ability variable though significant is but small. The use of students' HKCE results as their cognitive ability has its limitation. Chapter Three captures the debate and describes the difficulty in using ability to determine the rate of return of a person's education. HKCE results are tests to measure school achievement. The results indicate more the ability which has been 'contaminated' by education than the innate ability. As it is, it appears likely that

much of the effect of ability on the expected earnings has been explained indirectly through education.

In the study, the quality of institutions is included to ascertain its effects on the expected lifetime earnings. The significance of this variable in affecting the anticipated lifetime earnings is apparent in Table 6.6 though the impact is small (Equation 5; the inclusion of the variable explained only 1.62% of the models). One interesting feature is the impact of the quality of institution (QI) and cognitive ability (CA) on boys and girls. For the whole sample, the two variables exert significant influence on the expected lifetime earnings. QI and CA are different forms of expression of ability - QI the collective (average) while CA the individual form. The significance of these two variables imply that the expected lifetime earnings are related to ability though the two variables have complementary effects on each other. But when it comes to different sex, the two variables create a subtle difference. For boys, the impact of QI is very small (R^2 change is only 0.92%). When the variable of CA is included, much of the influence of QI is taken by CA and QI becomes non-significant (Equation 15 to 20). For girls it is just the opposite. By itself QI is both significant and has impact of about 2.3% (Equation 24)

on the expected lifetime earnings. It remains so even after the inclusion of CA and CA is non-significant. Their different effects on sex reflect some characteristic of boys and girls in Hong Kong. At the age of 17 or 18, boy students seems to be less swayed by school and are more independent in mind. Their individual ability (results in HKCE) is a better guide for the anticipated lifetime earnings. Boys of high ability expect higher earnings than the middle ability boys and in turn they expect higher earnings than the low ability boys. For the same age, girls seem to be more socialized and are more prone to the influence of school in the expectation of earnings. Hence for girls, it is those from the high quality schools who have the biggest advantage over those from the middle quality schools and in turn they have an advantage over those from the low quality schools.

In the models in Table 6.6, parents' education does not seem to have much bearing on the expected earnings except for boys. For boys, the parents' education which is largely secondary or post-secondary carries significant impact on the lifetime earnings although the impact is small. A further breakdown of parents' education into father and mother education does not reveal any difference of impact on the expected

earnings. It is true that father's job is to a large degree affected by his educational level. It seems likely that the effect of parents' education on earnings is mediated through the father's actual working experience.

The students' choice of Arts or Science stream is one of the two variables which has non-significant effect on the lifetime earnings. It is also one of the least influential variables in the models (R^2 change is 0.0008) other than the deferment of gratification which has a R^2 change of 0.0004. In the division of students into Arts or Science stream in Form IV and V in Hong Kong, the students still have to follow seven to eight subjects up to the HKCE. Arts or Science stream may be an indication for further specialization in higher education and may affect students' choice for higher learning. But it is surely too early in Form V to see any lasting effect of streaming on the expected lifetime earnings reflecting individual discipline.

The significant bearing of the willingness to take risks indicates that those who express a preference for risky occupation expect to have higher earnings. This effect is marked for both boys and girls. While it may seem that the students are ready for a trade-off between

willingness to take risks and expected earnings, the evidence is far from conclusive. For one thing, the willingness to defer gratification does not carry the same significant effect. When the data are later analyzed based on ability grouping (Table 6.8), for the high ability boys the variable shows a negative significant effect on expected earnings. This means that the high ability boys who prefer future promotion prospects over an initially high income employment would have less advantage on the expected earnings. In the rapid economic development of Hong Kong where the risk of unemployment is close to zero, it is possible that what many students are after is a highly paid job and dislike jobs which offer only an average return.

Table 6.6
Regression for log expected lifetime earnings and other variables

B ($'0000)						ß (Beta)													
UE	LS	FB	S	QI	CA	INTER-CEPT	UE	LS	FB	S	QI	CA	A/S	PE1	PE2	AR	GD	R^2	R^2 change	α
LL																				
						14.79*	.480*											.2221	.2221	UE/19
111	-62					14.82*	.408*	-.227*										.2641	.0420	0.52
						14.81*	.380*	-.198*	.207*									.3069	.0428	19/17
						14.76*	.372*	-.208*	.216*	.136*								.3289	.0220	0.43
						14.60*	.341*	-.171*	.209*	.144*	.086*							.3451	.0162	
						14.56*	.325*	-.151*	.210*	.142*	.059*	.028*						.3491	.0040	
						14.55*	.322*	-.150*	.209*	.130*	.061*	.026*	.030					.3499	.0008	
						14.58*	.320*	-.146*	.194*	.132*	.059*	.026*	.030	-.037				.3514	.0015	
						14.62*	.319*	-.146*	.184*	.132*	.058*	.026*	.029	-.073*	-.043			.3522	.0008	
0						14.46*	.305*	-.142*	.177*	.116*	.061*	.021*	.036	-.063	-.028	.036*		.3736	.0218	
1	58	-27	34	22	35 12	14.46*	.304*	-.141*	.177*	.116*	.061*	.021*	.036	-.063	-.028	.036*	.005	.3740	.0004	
OYS																				
2						14.86*	.497*											.2268	.2268	UE/19
3	127	-76				14.95*	.408*	-.245*										.2744	.0476	0.61
4						14.90*	.397*	-.224*	.178*	/								.3021	.0277	19/17
5						14.79*	.381*	-.203*	.183*	/	.066*							.3112	.0091	0.47
6						14.71*	.346*	-.163*	.184*	/	.023	.047*						.3220	.0108	
7						14.72*	.349*	-.165*	.185*	/	.021	.049*	-.018					.3223	.0003	
8						14.74*	.346*	-.162*	.174*	/	.020	.050*	-.016	-.024				.3229	.0006	
9						14.87*	.333*	-.161*	.141*	/	.018	.052*	-.020	-.151*	-.156*			.3320	.0091	
0	77	-39	33		22 25	14.71*	.316*	-.159*	.134*	/	.030	.043*	-.010	-.149*	-.149*	.030*	.007	.3481	.0159	
IRLS																				
1						14.76*	.464*											.2213	.2213	UE/19
2	110	-63				14.83*	.398*	-.230										.2663	.0450	0.46
3						14.75*	.353*	-.185*	.244*	/								.3316	.0653	19/17
4						14.57*	.308*	-.143*	.228*	/	.100*							.3546	.0230	0.34
5						14.55*	.303*	-.136*	.228*	/	.089*	.012						.3554	.0008	
6						14.55*	.300*	-.135*	.226*	/	.091*	.008	.055*					.3588	.0034	
7						14.58*	.298*	-.129*	.207*	/	.088*	.007	.053*	-.049				.3614	.0026	
8						14.56*	.297*	-.128*	.212*	/	.089*	.008	.053*	-.032	.020			.3616	.0002	
9	51	-22	37	/	45 4	14.40*	.286*	-.121*	.206*	/	.083*	.007	.060*	-.015	.041	.039*	.003	.3873	.0257	

* Figures significant different from zero at 5% or lower level.

Equation ln ELE = $a + ß_1UE + ß_2LS + ß_3FB + ß_4S + ß_5QI + ß_6CA + ß_7A/S + ß_8PE1 + ß_9PE2 + ß_{10}AR + ß_{11}DG$

where Ln ELE = Estimated log lifetime earnings
UE = Intention to enter university education
LS = Intention to leave school after F.5
FB = Family background
S = Sex
QI = Quality of institution
CA = Cognitive ability
A/S = Arts or Science stream
PE1 PE2 = Parents' education
AR = Attitude to risk in employment
DG = Propensity to defer gratification

6.31 Interactions of social background, ability and quality of schools

Table 6.7 further examines in more detail the effect of social background according to father's occupation on the intention for higher education and expected earnings. A similar work done by Williams and Gordon (1981) provides a guide for the present analysis. The R^2 value of boys is slightly higher than the girls, but within the same group they are very similar. In Table 6.6, it is revealed that students from non-manual home expect a higher lifetime earnings than their counterparts from manual home, but when they are separated into two distinct groupings (Table 6.7), it shows that students from both social backgrounds carry similar expectation from higher education for higher lifetime earnings. Those from manual home background seem to have a slight edge of earnings advantage resulting from higher education over their counterparts from non-manual home background. This is true for both boys and girls. It is argued that while students from the non-manual home have already been socialized towards higher education, students from manual home need the expectation of a higher potential earnings advantages in order to be persuaded of the desirability of entering higher education (Williams and Gordon, 1981). The

expectation of higher potential earnings advantage from boys and girls of manual home in Hong Kong perhaps explain why the demand for higher education in Hong Kong is on such a massive base.

Among boys from the manual home background, they are significantly affected by their ability in their earnings expectation; among girls from the manual home background, their expected earnings are significantly affected by the quality of schools and streaming. Hence, for boys from manual home background, the high ability ones expect to earn more than the low ability ones. For girls from the manual home background, those from the higher quality schools and those who study science expect higher earnings than those from lower quality schools and those who take up Arts subjects.

Among the four groups of students (two different social backgrounds with difference in sex), those who expressed a willingness to take risky jobs are significantly associated with higher expected earnings.

Table 6.7
The influence of social class on expected lifetime earnings

	B ($'0000)		β (Beta)											
	UE	LS	INTER-CEPT	HE	LS	FB	S	QI	CA	A/S	PE1	PE2	AR	GD	R^2
BOYS															
Blue	97	-44	14.68*	.344*	-.165*	/	/	.023	.051*	-.023	-.150	-.146	.026*	.017	.3290
White	91	-60	14.98*	.249*	-.122*	/	/	.043	.024	.015	-.142	-.142	.040*	-.022	.3029
GIRLS															
Blue	72	-25	14.50*	.310*	-.137*	/	/	.087*	-.005	.063*	-.028	.021	.028*	-.0002	.2907
White	55	-21	14.44*	.257*	-.119	/	/	.062	.034	.055	-.012	.076	.065*	.004	.2894

* Figures significant different from zero at 5% or lower level.

Table 6.8 examines the interaction between ability, education intentions and expected earnings. In a similar analysis, Williams and Gordon (1981) argued that for the most able students, they are likely to have been gradually socialized towards education and would anticipate leaving the education escalator only if they had seen very promising prospects elsewhere. For the middle ability students, they were less likely to see the case as an open issue and they required higher average earnings prospects to be convinced to continue into higher education. It is interesting to find in Table 6.8 that the low ability students (both boys and girls) expect to have the biggest advantage resulting from higher education. The expected advantage is almost two times more for the boys than girls. On the other hand, the R^2 for high ability boys is 60% more than that of low ability boys, and for girls the difference is

close to 60%. A closer examination of the case reveals that in the low ability, those intend to go on to university education are largely from white-collar family. 15.8% of low ability white-collar students and only 4.1% of low ability blue-collar students expect to carry on with education until university level. These seem to indicate that while low ability boy students expect a high return from university education, they are less certain of the possibility. On the contrary, though expecting less high advantage, the high ability boys are more set on their goal for higher learning. In terms of confidence, the middle ability boys are in between - less than the high ability students but are better than the low abilities.

Among boys, the low ability ones are the only group which is significantly affected by family background in their earnings expectation. The benefit of the family influence for the low ability students of non-manual home background is clear. On the other hand, all girls of different abilities are affected significantly by family background. Irrespective of the ability of girls, those who are from the non-manual family generally expect to have higher earnings. The influence from family for the high and middle ability boys comes from their parents' education. For the middle ability boys

whose parents have mainly primary education are at a disadvantage in the expectation of earnings compared to those whose parents have secondary or post-secondary education. For the high ability boys, those whose parents are of post-secondary education level have slight advantage in the expectation of higher earnings over those whose parents have on average only secondary education. This seems to indicate that in the high and middle ability groups of students, when other factors are being controlled, the parents' higher education level becomes a factor of influence upon the expected earnings.

The students' association of high expectation of earnings and their attitude towards the average pay job are interesting. Among the three different ability groups of girls, they are all similarly affected by their attitude towards the average pay job - those who prefer high pay jobs expect higher earnings, hence no difference among them could be said on the same factor. For boys, only those high ability boys who are ready to take up high pay jobs expect higher earnings. The high quality boys are somehow different from their counterparts of lower ability. For them they would prefer a job that pays well to start off. Obviously this is not a view shared by the girl nor boy students of

lower ability.

For middle ability girls, the quality of schools and streaming have significant influence on earnings. The middle ability girls who are from high quality schools have an advantage of bigger earnings expectation than their counterparts in middle and low quality schools. For the same group of girls, those who take science subjects expect higher lifetime earnings than those who take arts subjects.

Table 6.8
The influencing of ability on expected lifetime earnings

	B ($'0000) UE	LS	β (Beta) INTER-CEPT	HE	LS	FB	S	QI	CA	A/S	PE1	PE2	AR	GD	R^2
BOYS															
High	118	-23	14.83*	.357*	-.086	.118	/	.059	/	-.031	-.128	-.291*	.112*	-.055*	.3747
Middle	91	-51	14.87*	.275*	-.193*	.070	/	.038	/	-.010	-.232*	-.166*	.018	.023	.2682
Low	143	-44	14.86*	.408*	-.170*	.250*	/	.008	/	-.078	-.076	-.126	.011	.008	.2282
GIRLS															
High	53	-12	14.27*	.291*	-.078	.187*	/	.096	/	.067	-.013	.029	.068*	.008	.3548
Middle	57	-25	14.41*	.273*	-.147*	.199*	/	.095*	/	.114*	-.050	.049	.041*	.0004	.3781
Low	73	-20	14.51*	.310*	-.103*	.218*	/	.038	/	-.042	-.029	.023	.024*	.005	.2074

A study of the ability breakdown of students according to the quality of schools (Table 6.9) reveals further information on the picture.

Table 6.9 gives the breakdown of students according to the type of schools. There are a number of similarities of the situation between Table 6.8 and 6.9.

The father's occupation still affects only the low ability boys but all the girls. The influence of parents' education is narrowed down to only the middle ability boys. But the influence of the attitude towards risky jobs has extended to middle ability boys, leaving the low ability boys the only disadvantaged group in this factor. Probably the most noteworthy result from this part of the analysis is the different value of R^2. Under the ability groupings (Table 6.8), the high ability boys has a R^2 of .3747 and the girls .3548. Under the grouping of quality of schools (Table 6.9), the R^2 of both middle and low quality schools of boys and girls remain largely unchanged, but the R^2 of boys of high quality is raised to .4369 and the girls is reduced to .2112. Earlier, it was argued that boys were more independent in their expectation of earnings while girls were more socialized and more readily affected by the school environment. It is possible that in the high quality schools while the boys relied more on their individual merits for higher education and the expected earnings and are less affected by their classmates' attitude, the girls of different abilities are more socialized towards education and its benefits and share similar expectations in the anticipated earnings. Hence the middle ability girls in these schools are not very much different in their earnings expectations from the

high ability girls. This tends to reduce the value of R^2.

In the high quality schools, when other factors are under control, the influence of science over arts for girls in the expectation earnings becomes prominent. The girls who take science subjects have an edge of advantage in the expected earnings than those who take arts subjects.

Table 6.9
The influence of school quality on expected lifetime earnings

SCHOOL QUALITY	B ($'0000) UE	LS	B (Beta) INTER-CEPT	HE	LS	FB	S	QI	CA	A/S	PE1	PE2	AR	GD	R^2
BOYS															
High	63	-51	14.81*	.209*	-.208	.112	/	/	.030	.176	-.192	-.267	.074*	-.023	.4369
Middle	104	-52	14.79*	.330*	-.217*	.057	/	/	.044	-.059	-.190*	-.138	.031*	.020	.3195
Low	102	-38	14.83*	.314*	-.149*	.213*	/	/	.030	-.058	-.111	-.172	.010	.012	.2655
GIRLS															
High	67	-19	14.71*	.243*	-.083	.176*	/	/	-.005	.142*	-.028	.040	.047*	.001	.2112
Middle	64	-30	14.51*	.276*	-.160*	.241*	/	/	.006	.053	-.013	.086	.043*	.002	.3690
Low	101	-17	14.62*	.370*	-.081	.149*	/	/	.017	.0007	-.114	-.083	.027*	.006	.2109

6.4 Perceived Private Rates of Return

The perceived age-earnings profile shown in Figures 6.1, 6.2 and 6.3 rise with age and the profiles of those young people intending to study full-time education particularly for higher education rise more sharply and reach higher income levels than those of yearly school leavers. The perceived age-earnings are slightly higher than the *ex post* earnings profiles. The calculation of the *ex ante* private rates of return to higher education are shown in the following sections.

As explained in Chapter 4.12, the perceived lifetime earnings are computed from the following formula:

$$ELE = 0.5(26 - A)(E_1 + E_2) + 10(E_2) + 29(E_3)$$

Where

ELE = Estimated expected lifetime earnings
A = Age of starting full-time work
E_1 = Expected earnings when starting full-time work
E_2 = Expected earnings at age 26
E_3 = Expected earnings at age 46

The estimated expected lifetime earnings are replaced by estimated discounted lifetime earnings as follows:

$$DLE^{72} = 0.5(26-A)[E_1 + (E_2)(1-r)^{(26-A)}] + 10(E_2)(1-r)^{(36-A)} + 10(E_3)(1-r)^{(46-A)} + 19(E_3)(1-r)^{(65-A)}$$

where

r = private rate of return

and the earnings function is of the following forms:

$$DLE = \beta_1 UE + \beta_2 LS + (etc....)$$

When r = 0, DLE is the same as ELE. When r is between 0 and 1 (ie $0 < r < 1$), the effect is to reduce the explanatory power of UE and LS upon the dependent variable (In the case ELE). Thus we can choose the r so that β_1 equals 0. This corresponds to the rate of discount at which the average expected net benefit from university education rather than leaving school at 19 is zero and the r corresponds to the perceived internal rate of return. A diagrammatic explanation of the steps in the calculation of DLE is given in Chapter 4.12, Fig 4.1.

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[72] In the formula used by Williams and Gordon (1981) in estimating the rates of return, students' grants are included as part of the students' earnings for those who opted for higher education. In Hong Kong only about 40% undergraduates received some form of grants, hence it is not included in the calculation. It is likely that the rates of return calculated for university education may be under-estimated for some students.

The value of r[73] for which β_1 and β_2 are equal to 0 is given for boys in Table 6.10. Included in Table 6.10 are two private rates of return to university education calculated by Hung (1982) and Kwok (1984) for male using life earning profiles of 1976 bi-census and 1981 main census (Hung adopted the simple tabulation method and Kwok used Mencer's experience model). The unadjusted perceived internal *ex ante* rates of return for university education of 22.05% for boys and 21.0% for girls in the present study are remarkably close to the 25.19% by Hung (1982) and 20.82% and 21.24% by Kwok (1984) based on 1976 bi-census and 1981 census. On the other hand, the unadjusted

Table 6.10
Ex ante private rate of return to higher education and the comparison with calculated rates from census data for males

		Unadjusted Marginal (ex ante) rate of return 1986	Hung Private rate of return 1976	Kowk Private rate of return 1976	1981
UE/19	Boys	.2205	.2519	.2082	.2124
	Girls	.2100	/	/	/
19/17	Boys	.3305	/	/	/
	Girls	.3515	/	/	/

[73]. The rate of return is assumed to be in uniform throughout the whole life.

perceived *ex ante* rates of return for post-secondary education for boys (33.05%) and girls (35.15%) are higher than the rates for university education. No comparison is made here with local data since no study has been done in Hong Kong for the private rate of return for post-secondary education.

When comparison is made with the findings by Williams and Gordon (1981), it is found that the perceived rates of return for university and post-secondary education are higher in Hong Kong for both boys and girls. The difference may explain the different patterns of demand for higher education in the two places. However there are similarities in the two studies. In both cases, the perceived rates of return for the lower level of education is higher than university education.

Table 6.11 further captures the private *ex ante* rates of return based on father's job, ability groups and quality of schools[74]. While for the students from

[74] No rates of return are calculated for post-secondary education since there are two few cases in different ability groups who opted for work after Form V.

manual family background they do not seem to need a better return investment in higher education, this is not true for boy students from low quality schools or of low ability. In the study of the relation between perceived rates of return and social class and ability, Williams and Gordon (1981) believed that the perceived rates of return differed between social class and ability which helped to account for differences in the propensity to stay on at school by young people from different family backgrounds. However their belief could not be substantiated by the data. Table 6.11 doesn't show a clear relation between 'ability' or 'social background' or 'quality of schools' with perceived rates of return either. Students from different family backgrounds, ability or quality schools all expected fairly high rates of return from university and post-secondary education. There are some differences between the groups but the difference is slight. For boys, the range of rates of return is from 17.85% to 28.5%; for girls, it is from 27.25% to 23%.

The relatively high rates of return of students from different socioeconomic background, ability and quality of schools may account for the reason why higher education in Hong Kong is in such a popular demand.

Table 6.11
Ex ante private rates of return by father's job ability and quality of schools

	Unadjusted Return UE/19	
	Boys	Girls
Manual	.2485	.2095
Non-manual	.1795	.1975
High Ability	.2350	.1885
Middle Ability	.2505	.2005
Low Ability	.1785	.2250
High Quality Sch	.1850	.1725
Middle Quality Sch	.2850	.1980
Low Quality Sch	.1865	.2300

6.5 Overseas Education and The Perceived Rates of Return

The last piece of study centres on the perceived rates of return to overseas education. Each year a large number of students leave Hong Kong for countries like US, Canada, UK and Australia for higher studies. Do they go because they foresee a higher benefit from overseas education? In the present study, there are 120 students (7.1% of the total students in the study) who indicated that they would like to go overseas for higher education. Table 6.12 compares their perceived lifetime earnings with those students who opted for university education locally. It shows that for post-secondary

education, both overseas and local students expected a similar lifetime earnings. For university education, while the boy students from overseas group expected less than their counterparts from local group in their lifetime earnings, this is not the case for the girl students. As a whole, the overseas group expected a slightly higher lifetime earnings than their local students.

Table 6.12
Comparison of expected average lifetime earnings (mean) between local (university intended) and overseas students

CAREERS INTENTIONS	Intended for CUHK	Intended for HKU	Intended for Overseas ed
ALL			
Post-sec	3,139,943 (136)	3,283,922 (227)	3,143,926 (74)
University	4,555,449 (84)	4,976,367 (183)	5,283,495 (40)
BOYS			
Post-sec	3,445,008 (54)	3,565,724 (94)	3,381,133 (18)
University	5,237,481 (37)	5,646,987 (82)	4,722,000 (11)
GIRLS			
Post-sec	2,939,048 (82)	3,084,753 (133)	3,067,682 (56)
University	4,018,531 (47)	4,431,903 (101)	5,496,476 (29)

Figure inside () indicates the number of cases

Table 6.13 further examines the family background of the students who intended to go overseas and their perceived rates of return to university education. The

students are composed of largely girls (74% girls as against 26% boys). The majority of the girls (53.9%) are from non-manual family while the majority of boys (61.3%) are from manual family - a fact which affects their perceived lifetime earnings. In the perceived rates of return which were estimated by using the same formula employed to calculate the rates of return for the other groups of students, there does not seem to be any big difference between boy and girl students - the rate for boys is 22.75% while for girls it is 20.25%. Nor are they very much different from the expected rates of return to other groups of students.

Table 6.13
Family background and perceived rates of return of students for overseas education

	Manual	Non-manual	Unadjusted Return UE/19
Boys	19 (61.3%)	12 (38.7%)	.2275
Girls	41 (46.1%)	48 (53.9%)	.2025

One argument of this rather homogeneous perceived rates of return for university education from students of different backgrounds is that students are

able to discern the benefits associated with university education in general. This general knowledge is shared by students of different background, ability, quality of schools and destination. The Form V students, despite their different backgrounds, who opted for university education may vary very little in their anticipated earnings in their 3 different points in life. The students may not be fully informed of the market change for educated labour, but their knowledge of the requirements for higher education - an access to high-paying jobs is sufficient to motivate many of them, particularly those who have ability to continue to seek higher education.

6.6 Summary

This chapter examines the factors which contribute to the expected lifetime earnings of the students. It is able to establish that students are quite realistic in their perceived expected earnings associated with different levels of education. This shows that students do have a fairly accurate assessment of the earning prospects associated with the educational path they wish to follow.

In the further analysis of students expected perceived lifetime earnings according to family background, students' ability and quality of schools, it is discovered that while education intentions, ability of students and quality of schools affect the expectations of students in their perceived monetary rewards, family background is also an important factor to be reckoned with.

In the regression analysis, it is found that the proportion of earnings differentials attributed to education alone is rather low in Hong Kong. It is 0.52 for university education and 0.43 for post-secondary education. The low figures of alpha coefficient seem to indicate that the influence of family background, ability, and quality of schools are also important in determining the expected earnings.

The *ex ante* private rate of return to university education as perceived by boys is calculated at 22.05% and for girls at 21%, similar to the figures calculated from the actual earnings profile. The perceived *ex ante* private rates of return to university education are also high for all groups of students, ranging from 17.85% to 28.65% for boys and 17.25% to 23% for girls,

irrespective of their family backgrounds, ability and quality of schools. Other than this, the perceived rates of return of students who opted for overseas studies were also estimated and they are found similar to the other. These relatively high perceived private rates of return to higher education may explain the popular demand for university education in Hong Kong.

CHAPTER 7 CONCLUSION

This thesis sets out to use Hong Kong as a case to examine the propositions of:

a) Human Capital Theory that students take systematic forward-looking view of earnings prospects associated with higher education and

b) Screening/Signalling Hypothesis that students are aware of their ability and those who are capable would invest more in higher education.

The perceived earnings functions and *ex ante* rates of return to higher education of the students were also estimated. In the process, the factors which affect the demand for higher education were also explored. The thesis used the Form V students who were at the end of their secondary school education as objects for study.

7.0 Whether Students are Motivated by Economic Considerations for Higher Education

The test on whether students taking forward-looking views on earning prospects is analyzed in Chapter 5.2 which was based on the answers on 'Reasons for Study' in the questionnaire. This was a question answered by 3/4

of the students who indicated that they would continue full-time education after Form V (Chapter 5.1, Table 5.1). The answers given were further tabulated according to the economic reason, consumption view and parents and peer influence. It was found that 72.3%, 23.6% and 4% of the students subscribed to the three different views respectively. A one sample chi-square is applied to the data and the observed significant value of chi-square is smaller than 0.0001 which shows that there is difference in the choice of main reason for higher studies. This gives support to the argument that students are taking a forward-looking view of earning prospects in association with higher education.

No doubt, based on such a simple survey to conclude that the majority of the students are ready to take up higher education as a means to enhance their further earning prospects is far from satisfactory. A more sophisticated way is needed to show that students pursue education because they see higher private rates of return for the higher level of education.

7.1 The Extent to Which Students are Aware of Their Ability and The Effect Ability Has on The Capable Students in The Pursuit of Higher Learning

The test of the Signalling Hypothesis in the present study does not follow the authentic methods. The few examples of empirical study of Screening/Signalling Hypothesis were provided by Taubman and Wales (1973) who adopted the 'high and low paying employment' idea and argued that education was used as a screening device where workers with relatively low education were prevented from entering high-pay occupations. Applying Mincerian log-earnings function of schooling and following the similar line of arguments by Taubman and Wales, Riley (1979) established that educational screening would be used more extensively in the screened sector where direct observation of an individual's productivity and evaluation of an individual's productivity and evaluation of his potential was much more difficulty than in other occupations. Both these examples used labour market data for their analysis.

In Hong Kong, academic criteria are the sole determining factor for advancement to higher study and demand for higher education is very high. Making use of a time gap between the Form V students who declared their education intentions when the survey of the

present study was conducted and three months later when they sat for the HKCE, the present study tries to probe the question of whether students are aware of their ability and whether students of high ability intend to proceed more towards higher education than those of less ability.

According to their declared intentions in the survey, the students are divided into three categories: those who would cease full-time study after Form V; those who would prefer to proceed to post-secondary education and those who would continue to university education. The case is to test whether these three intentions are all ability related, i.e. whether those who prefer university education are better in their ability than those who prefer post-secondary education and in turn whether they are better than those who cease study after Form V. In the case of Hong Kong, it is possible that if they were asked to indicate their choice of higher education, they would all opt for it irrespective of their ability. Such a possibility provides an opportunity for the test.

Using pearson chi square, Chapter 5.3 shows that the achievement in HKCE and the education intentions are closely related. Log linear model is further applied

which indicates that low ability is the main cause of low intention in educational goal. Not only the three categories of education intentions are ability related, the choice of different courses after Form V and the institutions are closely associated with students' ability.

Could this phenomenon be interpreted differently other than the Signalling Hypothesis? After all, while it is established that students are aware of their ability and that education intentions are ability related, the signalling view is only implicitly implied.

In Chapter 2.3 to 2.4, it describes at length the development of the secondary schools in Hong Kong which was based largely on ability criterion. A continuous exposure of the students to this system may have developed among them a sense of their 'worth'. It is possible that students who are at the end of their study in secondary schools become aware of their general ability. The academically weak students from low quality schools and from middle or high quality schools would be more ready to accept their 'inferiority' and are less ambitious in their future plan. They may be more ready to settle down in the early stage of their careers while the able students would continue to forge ahead for

higher education. It may be that some effects of 'sponsored' mobility as described by Turner (1960) is working in the Hong Kong schools.

This explanation above should not give Signalling Hypothesis a devastating blow. In fact there need not be contradiction between the two arguments. In Signalling Hypothesis, student's awareness of their own (general) ability is assumed (Stiglitz, 1975). If students were not aware of their own, albeit general, ability, no theory of signalling would have been established. It is possible that students become sharply aware of their own ability through the 'sponsored' system of education and are economically motivated to seek further education. It is also possible that the 'sponsored' system of education plays a part in forming the 'psychic' cost[75] of the weak students which discourages them from the continuation of further education. More evidence is presented below to shed light in the arguments.

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[75] Spence (1973) assumed that signalling costs, which broadly include psychic, time, monetary and others, were negatively correlated with productivity

7.2 Support of the Human Capital Theory and Signalling Hypothesis

The further support of the Human Capital Theory and Signalling Hypothesis lies in whether students with ability actually foresee the benefits of higher education and act on it.

In the study, students of different education intentions were asked to estimate their earnings in 3 life points: when they started to work; when they were at 26 and 46. If students are able to foresee the benefits of higher education, those who opt for university education should expect higher earnings in the 3 life points than those who opt for post-secondary education and in turn they should expect higher earnings than those who prefer to work after Form V.

In fact, this is exactly the response of the students. When a comparison is made with the actual earnings of similar qualifications as surveyed in the General Household Survey conducted by the Census Department in 1986, it discloses that the estimations by the students are quite realistic as compared with the actual earnings figures. This indicates that the students are aware of the different benefits associated

with higher education.

An appropriate way to decide whether students react to market changes is to study the relations between the demand for higher education and the change patters of earnings in the market for educated manpower. Indeed Freeman (1975) has shown that in the States, as a consequence of 'new depression' in the market in the 70's, the demand for college education slackened. But this study is hardly possible when higher education is chiefly controlled by governments.

In Hong Kong the supply of higher education is in total control of the government. The restrictive characters of the education system further makes it impossible to test directly that the demand for higher education is sensitive to earnings changes in the market. In fact, the secondary school students may not be sufficiently aware of the change of labour market for educated manpower. Nevertheless, the association between higher education and higher earnings could be easily discerned[76]. It is likely that the students are aware of

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[76] For example, in the Master Pay Scale of the government which forms an indicator for wage levels for commercial and industrial sectors, the top salary of the senior professionals and management - posts for post-secondary and university education (scale 51) is 12 times higher than the bottom wage in the scale

the fact that higher earnings is 'guaranteed' by higher education. Indeed the arguments that students in the final year of secondary school education in Hong Kong are able to foresee the benefits associated with higher education are supported by the findings.

The above reasoning brings the issue closer to the view of Signalling Hypothesis. Although the students foresee the benefits related with higher education, it is more the association of higher education with high-paying jobs that they are aware of, not the actual labour market demand for educated manpower. For the majority of the students, higher education has become the proxy for high-paying jobs. The students are fully aware of the requirements for entering higher education. It is those with ability who could achieve higher education. It was shown in Chapter 5.3 that students were aware of their own ability and the education intentions were ability related. Those who were the most able intended to invest more in university education; those who were less able intended to stop at post-secondary education and those who were the least able

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(scale 1) for street cleaners. Students may not be accurate in the actual monetary difference between the top and bottom scales but they may be aware that there is a big gap between the two.

ceased to invest further in education but preferred to work after Form V. Investment in higher education does become a clear sign of their ability. The more their investment, the greater their ability, the more chance for high-paying jobs and the higher the expected lifetime earnings.

7.3 The Influence of Students' Socioeconomic Background, Quality of Institutions, Sex and Abilities on The Pursuit of Higher Education

The results in Chapter 5.21 to 5.23 establish apparently the influence of socioeconomic background in terms of parents' occupation and parents' education on the pursuit of higher education.

There are 16% more students whose fathers held manual jobs opted for work after Form V than those from non-manual job backgrounds. On the other hand, 15% more students who were from non-manual family backgrounds had a higher intention for university education than those from manual ones. The log-linear model further confirms that the father's manual job was a significant factor which affected the child's intention to work after Form V.

The influence of parents' education on students' intention for higher education is found equally effective particularly when the far ends of the wide range of parents' education is compared. 21% more students whose parents' education was at the primary level were prepared to settle for work after Form V than students whose parents' education was at the post-secondary level. On the other hand, 22% more students whose parents had post-secondary education were more willing to pursue university learning than their counterparts whose parents had only primary education. The log-linear model also confirms that the parents' primary education level is the main reason for the children's intention to work and the parents' post-secondary education is also a significant factor for the child's intention to pursue university education.

Analysis in Chapter 5.23 shows that the impact of quality of institutions on the education intentions of students is proved to be significant. Perhaps it is not surprising to find that the effects of quality of institutions on education intentions are 'hierarchical' as follows:

a) More students from high quality institutions (48.2%) chose university education than their counterparts in middle quality (26.0%) and low quality institutions (10.3%).

b) More students from middle quality institutions (56.7%) chose post-secondary education than their counterparts in low quality (45.6%) and high quality institutions (46.2%).

c) More students from low quality institutions (44.5%) chose to work after Form V than their counterparts in middle quality (17.3%) and high quality institutions (5.6%).

The impact of Arts/Science stream is also proved to be significant. In term of results in HKCE, the Science students outshine the Arts students and likewise in their education intentions. But this is not the same in sex for education intentions. Girls are equally ambitious in their education intentions. At the HKCE level they achieved significantly better results than the boy students particularly in the Arts subjects.

One of the interesting findings in the study is the discovery that fewer boys of Arts stream (14.6%) from the high quality institutions had intentions for university education than their counterparts (23.2%) from middle quality institutions. On the other hand, among high quality institutions, an unusually high percentage of boys of Arts stream (26.8%) preferred to work after Form V than those from girls Arts stream (1.8%), girls Science stream (1.3%) and boys Science stream (4.3%) (refer to Table 5.16).

One explanation offered in the analysis is that this may be due to the emphasis on a narrow range of academic subjects and the rigid division into Science and Arts streams after Form IV in many schools in Hong Kong. Boys are often made to believe that they are better in science subjects. It is not uncommon in many schools in Hong Kong that boy students who could not choose science subjects are regarded as less capable academically. This situation may be more serious in high quality institutions. Boys in the Arts stream in high quality schools may have developed certain complex. This may be reflected in the lower grades attained by the boy Arts stream in high quality institutions. If this is the case, it is no wonder that their intention for higher education is affected.

This is a case which merits deeper investigation.

7.4 The Influence of Intended Education, Socioeconomic Background, Quality of Institutions, Sex, Ability and Others on The Perceived Lifetime Earnings

The investigation of the influence of intended education, family background, sex, ability, quality of

institutions on the perceived lifetime earnings focus on the study of the earnings function. The study is to account for the effects of these factors on expected earnings besides education.

One of the main difficulties of this kind of study, as explained in Chapter 3.13 is the limitation of proxy-variables used in the earnings functions. The use of the reported father's occupation and parents' education as variables of family background is not without its problem. For one thing the variables can not capture the changes and the influence which took place within the students' family over the years, even if the reported information is one hundred percent accurate.

Native ability is another variable which cannot be measured satisfactorily in the present study. If IQ is relevant, it is suggested to be measured early in one's life to prevent the 'corruption' by the environment and schooling. Lacking this, the present study relies on achievement tests which are no doubt heavily affected by schooling. Another variable which has difficulty in the specification is the quality of institutions. In the present study the average results of the students in HKCE are adopted. As pointed in the study, the use of HKCE results fails to account for the input of students

and to reflect the effects of the schools in the process.

Despite these limitations, the earnings functions are attempted and the following results are obtained.

The study confirms the findings of many similar studies that level of education has the highest influence on expected lifetime earnings of students. The change of the correlation coefficient ($R^{2)}$ of the variables illustrates this as follows:

Variables	R^2 change
Ln ELE (Estimated log lifetime earning)	
UE (University education)	.2221
LS (Leaving School)	.0420
FB (Father's occupation)	.0428
S (Sex)	.0220
QI (Quality of institution)	.0162
CA (Cognitive ability)	.0040
A/S (Arts/Science Stream)	.0008
PE1 (Parents' education)	.0015
PE2 (Parents' education)	.0008
AR (Attitude to risk)	.0218
DG (Deferment to gratification)	.0004

After the intended higher education, the influence of family background comes second on the expected lifetime earnings. The is particularly so in girls, which has increased the explanatory power of the models 6.53%. The influence of ability variable though

significant is but very small. As expressed in Chapter 6.31, the HKCE results are tests to measure school achievement which has been affected by education. It is likely that much of the effect of ability on the expected earnings has been explained indirectly through the intended education.

The significance of the inclusion of the variable of quality of institutions (QI) on the expected lifetime earnings is found to be apparent but the impact is very small. When QI is studied together with cognitive ability (CA), one interesting feature is observed. QI and CA are different forms of expression of ability - QI the average while CA the individual form. For the whole sample, the two variables exert significant influence on the expected lifetime earnings. But the two variables have different effects on sex. For boys, the impact of QI alone is very small. When the variable of CA is included, much of the influence of QI is taken by CA and QI becomes non-significant. For girls it is just the opposite. By itself QI is both significant and has impact of about 2.3% on the expected lifetime earnings. It remains so even after the inclusion of CA and CA is non-significant.

This different impact of QI and CA on sex reflects

some characteristic of boys and girls in Hong Kong. At the age of 17 or 18, boy students seems to be less swayed by school and are more independent in mind. Their individual ability (results in HKCE) is a better guide for the anticipated lifetime earnings. Boys of high ability expect higher earnings than the middle ability boys and in turn they expect higher earnings than the low ability boys. For girls the influence of schools may be a better guide. For the same age, Girls seem to be more socialized and are more prone to the influence of schools in the expectation of earnings. Hence for girls, it is those from the high quality schools who have the biggest advantage over those from the middle quality schools and in turn they have an advantage over those from the low quality schools.

Another variable in the earnings function worth reporting is Arts/Science stream although it is one of the variables which has non-significant effect on the lifetime earnings. It is also one of the least influential variables in the models (R^2 change is 0.0008). In Hong Kong, although students are divided into Arts and Science stream in Form IV and V, the students are required to take up seven to eight subjects to prepare for the HKCE. Arts or Science stream is clearly an indication for further specialization in

higher education and may affect students' choice for higher learning. But it is too early in Form V to see any lasting effect of streaming on the expected lifetime earnings reflecting individual discipline.

The finding of the low 'perceived' alpha coefficient (0.52 for university education and 0.43 for post-secondary education) which measures the impact of education after controlling the influence of the other intervening variables such as ability, family background, sex, quality of schools....etc in Hong Kong is also worth noting. Even after the adjustment made which raised the alpha coefficient to 0.64 for university education and 0.53 for post-secondary studies; for boys it was raised to 0.75 and 0.61 for university and post-secondary education respectively; for girls it was raised to 0.57 and 0.43 for university and post-secondary education respectively, the alpha coefficients are still low since higher education in Hong Kong is more selective than in UK and US, which should claim a higher value of alpha coefficient. It is argued that the cause of the low alpha coefficients for university and post-secondary education is due to the restrictive and selective character of the education system of Hong Kong which suggests a strong influence of family background. Hence it is argued that the lifetime

earnings estimated by secondary students in Hong Kong reflects more the restrictive character of the education system than the limited supply of educated labour in the market.

The study also examines the interactions of social background, ability and quality of institutions on expected lifetime earnings. The findings of this piece of study do not seem to correlate with the theories that go with it.

For example, it is believed that students from low ability groups, from manual family background and low quality schools in general expected lower lifetime earnings for the same intentions for education. It is believed that the low expectations over lifetime earnings lead to their low intentions for higher education. The findings do not lend support to this argument. While it is statistically proven (Chapter 5.21, 5.23 and 5.3) that those from worker family and from low quality schools were less inclined to opt for university education and education intentions are ability related, students from manual family background who opted for university education expected higher potential earnings than their counterparts from non-manual family. There is no lack of expectations from the

students of low ability for high return from university education either but they seem to be less certain of the possibility. Again the students of low quality schools also expect quite a high return from university education.

Earlier it was argued that the students were able to foresee the benefits associated with higher education which is being looked at as a gateway to high-paying occupations. It seems that this is a rather homogeneous view shared by most of the students - including those of low ability, those from worker family and those from low quality schools. Hence even though the education intentions are affected by family background, ability and quality of schools, for those who opted for university education, their expectations for lifetime earnings are more shaped by the view of the association between higher education and high-paying occupations than other factors.

7.5 The Perceived *ex ante* Rates of Return to Higher Education

The last part of the findings concentrates on the perceived *ex ante* rates of return to higher education. The purpose of it is to see the magnitude the demand for higher education could be explained by the perceived rates of return.

The estimated rates of return for post-secondary education were 33.05% for boys and 35.15% for girls. Although no actual rates of return for post-secondary education have been done in Hong Kong, it is believed that these rates are on the high side. Compared with the post-secondary education, the perceived rates of return for university education, 22.05% for boys and 21% for girls are low. But they are very similar to those figures calculated based on census data by Hung (1982) and Kwok (1984). Needless to say, both the rates of return to post-secondary and university education are attractive enough for students to stay on in full-time schools and higher institutions.

The rates of return for different family background, ability and quality of schools were further examined to see whether these factors affect the group's

different propensity for higher education. The findings show that although there were differences of rates of return among the students from different family backgrounds, ability and quality of schools, the differences, particularly for girls were small. The range of these differences were from 17.85% to 28.5% for boys and for girls they were from 17.25% to 23%. A further study of the perceived rates of return of those students who opted for overseas education reveals that their estimated rates of return (22.75% for boys and 20.25% for girls) are not very much different from the students who intended to continue their higher education locally.

The close range of the perceived expected rates of return for university education for different groups of students reaffirms the argument that there is a rather homogeneous view of the benefits associated with higher education among the students irrespective of their different family background, ability and quality of schools. As long as you are prepare to opt for university education, you would expect the similar benefits. Perhaps this explains the phenomenon why university education in Hong Kong is in such a popular demand.

When Williams and Gordon started their work in late 1970 on the effect of economic factors and the study of *ex ante* rates of return to higher education, they were concerned with the stagnation of the demand for post-compulsory education in England and Wales. The concern of the present study is just the opposite. Adopting a similar method of enquiry, the purpose of the study is to investigate the influence of economic factors in students' continuous demand for higher education. Both studies provide evidence to support arguments for their case. However, as far as the present study is concerned, the evidence is far from complete. For one thing the study does not provide evidence on whether students actually act on what they perceive even if they are aware of their ability and are ready to opt for higher education. Secondary school education may be too early a stage to predict the effect of choice of discipline - a concern for Human Capital Theory proponents in the study of rates of return.

This points out the shortcomings of the present study which relies solely on questionnaire technique. If time, resources and funds allow, it would be ideal if a longitudinal study could be carried out. It is certain that if students could be traced from the time they enter secondary education up to their university

education, many of the issues in the study could be better explained and analyzed and the questions more satisfactorily answered.

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Appendix I

A Study of Form V students' Demand for Higher Education
(English translation)

Questionnaire

Name: _____

Please attempt the following questions/statements with a ' 1/ '.

1. What is you sex?

   Male _____
   Female _____

2. Did you sit for the HKCEE last year?

   Yes _____
   No _____

3. Give a tick to the following subjects which you are going to take in the HKCEE this year.

   Chinese Language _____
   English Language _____
   Mathematics _____
   Chinese History _____
   History _____
   Chinese Literature _____
   English Literature _____
   Economics _____
   E.P.A. _____
   Physics _____
   Chemistry _____
   Biology _____
   Add Mathematics _____
   Others (please specify)

   _____

4. From the following statements, choose the one which best describes how much effort you normally put into you school work.

   I don't put any real effort into school work at all. _____
   I don't really put as much effort into my work as I need to. _____
   I just do the necessary amount of work. _____
   I work pretty hard, but not quite as hard as I could. _____
   I work as hard as I can. _____

5. As far as you can tell at present, what are you most likely to be doing at his time next year? (please tack one of the followings:)

I expect to be :

a. studying full-time at Form V again. _____
b. studying full-time at Form VI for HKU or Middle VI CUHK matriculation. _____
c. studying full-time at a technical institute. _____
d. studying full-time at a College of Education. _____
f. working at a job and studying part-time. _____
g. working at a job but not studying part-time. _____
h. job hunting.
i. some other thing (Please say what)

_____

6. How sure are you about your answer to Question 5?

Very sure _____
Sure _____
Not sure at all _____

Now if you answered a,b,c,d or e to question 5

please move on to <u>Question 10.</u>

If you answered f,g,h or i to question 5,

please move on to <u>Question 7.</u>

QUESTIONS FOR THOSE GOING TO WORK NEXT YEAR

7. What kind of job do you hope to get when you leave school ?

(please specify) _____

8. Here are some reason why people often decide to leave school. Please Mark whether you agree or disagree with each of these statements:

I am leaving:	Agree strongly	Agree Slightly	No opinion	Disagree slightly	Disagree strongly
a. because I do not like school.	_____	_____	_____	_____	_____
b. because I am not very good at school work.	_____	_____	_____	_____	_____
c. because most of my friends are leaving school.	_____	_____	_____	_____	_____
d. because I want to have some money of my own.	_____	_____	_____	_____	_____
e. because I have more chance of betting a job now than if I wait a year or more.	_____	_____	_____	_____	_____

9. Which of these reasons if the most important for you? (please write a or b, c...etc here).

_____

QUESTIONS FOR THOSE STAYING ON AT FULL-TIME EDUCATION NEXT YEAR

10. Here are some reasons why people decide to stay on at school or college. Please tell us whether you agree or disagree with each of this statement.

I am staying on:	Agree strongly	Agree Slightly	No opinion	Disagree slightly	Disagree strongly
a. because I enjoy studying.	_____	_____	_____	_____	_____
b. because I am good at school work.	_____	_____	_____	_____	_____
c. because I will get a better job if I carry on with my full time education now.	_____	_____	_____	_____	_____
d. because I want to have a better chance in competing with others for jobs.	_____	_____	_____	_____	_____
e. because most of my friends are staying at school.	_____	_____	_____	_____	_____
f. because I believe people should get as much as education as they can.	_____	_____	_____	_____	_____
g. because my parents think I should stay on.	_____	_____	_____	_____	_____
h. because I need more education for the kind of job I want.	_____	_____	_____	_____	_____

11. Which of these reasons if the most important for you? (please write a or b, c...etc here).

_____

12. If all goes will, what is the highest qualification you ever hope to get? (please tick one).

a. University or Polytechnic degree or above _____
b. Polytechnic diploma _____
c. Hong Kong University matriculation _____
d. Chinese University of Hong Kong matriculation _____
e. Others (please specify)

_____

3. Do you expect to continue your full-time education after HKU or CUHK matriculation?

Definitely Yes	Probably Yes	Probably No	Definite Yes
_____	_____	_____	_____

4. At which of the following institutions would you like to study after matriculation? (please mark your first choice with 1 and other places you would like to go with 2, 3, 4...etc)

a. College of Education	_____
b. HK Polytechnic	_____
c. Chinese University of Hong Kong	_____
d. Baptist College	_____
e. City Polytechnic	_____
f. Shue Yan College	_____
g. University of Hong Kong	_____
h. Ling Nam College	_____
i. Overseas University	_____
j. Others (please specify)	

_____

QUESTION FOR ALL FORM V STUDENTS

.5. At the moment you father is (please tick one)

a. Employed _____
b. Self-employed _____
c. Retired _____
d. Unemployed _____
e. Don't know _____
f. Others (please specify)

_____

.6. What is your father's job, or what was his last job? (please give details)

_____

.7. At the moment you mother is (please tick one)

a. Employed full-time _____
b. Employed part-time _____
c. Self-employed _____
d. A housewife _____
e. Retired _____
f. Don't know _____
g. Others (please specify)

_____

.8. Please tell us your parents' education. (please tick against the heading of Father and Mother)

a. No schooling
b. Primary school level
c. Primary school graduate
d. Junior secondary school level
e. Secondary school graduate
f. Post-secondary school level
g. University level

.9. We would like to know what you expect to be earning at various times in your life. Please ignore inflation for you estimation.

a. When you start work HK$_____ per month

b. When you are age 26 HK$_____ per month

c. When you are age 46 HK$_____ per month

20. What kind of job do you think you will have when you are age 26?

_____

21. Here are a list of some of the things that people look for when they are thinking about possible jobs. Please look at each one and mark whether it is the kind of job that you would like by a tick against the choice given.

I would definitely not like this kind of job
I would prefer not to have this kind of job
I would not mind one way or the other
I would quite like this kind of job
I would very much like this kind of job

	Very Much Like	Quite Like	Don't Mind	Prefer Not	Definitely Not
a. A job with good pay to start off but without much chance of promotion.	_____	_____	_____	_____	_____
b. A job with good prospects for pay after 10 years, but with low starting pay.	_____	_____	_____	_____	_____
c. A job where pay about average, but where there is little risk of being unemployed.	_____	_____	_____	_____	_____
d. A job where you meet a lot of new friends.	_____	_____	_____	_____	_____
e. A job working for the government.	_____	_____	_____	_____	_____
f. A job where you can take a lot of decision yourself.	_____	_____	_____	_____	_____
g. a job where the harder you work, the more money you get.	_____	_____	_____	_____	_____
h. A job where there is pleasant and comfortable place to work.	_____	_____	_____	_____	_____
i. A job that is socially useful to the community.	_____	_____	_____	_____	_____
j. a job that is not too difficult.	_____	_____	_____	_____	_____
k. A job where you get a good training while you are working.	_____	_____	_____	_____	_____

Appendix II

Median Income from All Employment: Age and Sex
Education Attainment 1st - 4th Quarters, 1985

EDUCATION ATTAINMENT

AGE GROUP	Secondary				College of Education				Matriculation				Polytechnic Diploma				Degree			
	Quarters				Quarters				Quarters				Quarters				Quarters			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Total																				
15-19	1778	1757	1717	1783	(2192	2250)	*	*	1840	(1733	1717	1714)	*	*	*	*	*	*	*	*
20-29	2500	2408	2408	2475	5058	5051	5033	5128	3112	2981	3029	2961	4552	4119	4284	4530	5930	5500	6057	6138
40-49	3641	3340	3370	3306	7575	7360	8241	8041	6250	5829	(5507)	7416	(9166	3980	7753	11111)	7696	5574	6624	5449
50+	3095	2714	2733	2783	*	*	*	*	*	*	*	*	*	*	*	*	(6100)	5427	(5998	7666)
Male																				
15-19	1784	1783	1728	1779	*	*	*	*	(1708)	*	(1667	1705)	*	*	*	*	*	*	*	*
20-29	2749	2627	2692	2746	(4251	2714	2964	5500)	3303	3025	3107	3115	4700	4176	4315	4439	6469	5680	6231	6339
40-49	3846	3653	3698	3671	(7500	7873	8061	4500	6900	6497	7199	8500	9000	9242)	7753	(11111)	8724	7602	7831	6090
50+	3224	2797	2884	2999	*	*	*	*	*	*	*	*	*	*	*	*	(6376	5499	6374	7500)
Female																				
15-19	1770	1730	1709	1787	(2192	2250)	*	*	(1890	1812	1749	1675)	*	*	*	*	*	*	*	*
20-29	2282	2199	2282	2250	5101	5326	5268	5016	2921	2916	2916	2803	4107	3999	4230	5166	5450	5304	5812	5874
40-49	2041	2004	2059	1960	7600	(7213	8310	8047	3500)	*	(4002	2416)	*	*	*	*	4252	3312	4000	3875
60+	(1875	1747	1500	1781)	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

Notes: 1. * denotes very few reported cases leading to unreliable estimate.
2. Figures in brackets are estimates derived from less 10 - 50 reported cases

Sources: Government Household Survey Quarterly Tabulation No 411, 1985